Notes (continued)

43/ Study on the Climatic and Other Global Effects of Nuclear War (United Nations publication, Sales No. E.89.IX.1), paras. 22-24.

44/ Then Director of the United States Arms Control and Disarmament Agency, Fred Iklé, is quoted in the Bulletin of Atomic Scientists, May 1975, p. 32, as saying:

> "We do know that nuclear explosions in the Earth's atmosphere would generate vast quantities of nitrogen oxides that surround the Earth. But we do not know how much ozone depletion would occur from a large number of nuclear explosions - it might be imperceptible, but it might be almost total. We do not know how long such depletion would last - less than one year, or over ten years. And above all, we do not know what this depletion would do to plants, animals and people. Perhaps it would merely increase the hazard of sunburn. Or perhaps it would destroy critical links of the intricate food chain of plants and animals, and thus the ecological structure that permits man to remain alive on this planet. All we know is that we do not know."

45/ Mark A. Harwell and Thomas C. Hutchinson, SCOPE 28: Environmental Consequences of Nuclear War, Vol. II, Ecological and Agricultural Effects, Chichester, John Wiley, 1985.

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CHAPTER VII

NUCLEAR WEAPONS AND INTERNATIONAL SECURITY

A. Nuclear weapons and security concepts

356. The Charter of the United Nations, which took effect in the aftermath of the Second World War, has laid down a broad foundation for world peace and order in the post-war era and has envisaged mechanisms for its preservation. It declared as one of the Organization's purposes to maintain international peace and security and to that end to take effective collective measures for the prevention and removal of threats to peace. It also recognized the inherent right of States to individual or collective self-defence in case of an armed attack and noted that nothing in the Charter precluded the existence of regional arrangements for the maintenance of international peace and security as appropriate for regional action. This has enabled States in meeting their security concerns to place emphasis on those options envisaged in the Charter which best suited their perceived national requirements.

357. The emergence of nuclear weapons has, however, added another dimension in the consideration of the question of individual, regional and global security of States, resulting in a long-lasting debate on the subject matter. This debate reflects differences in attitude on the role of nuclear weapons in general, and their relevance for national and international security in particular.

358. An overwhelming majority of non-nuclear-weapon States have formally renounced the possibility of acquiring or possessing nuclear weapons by adhering to the 1968 Treaty on the Non-Proliferation of Nuclear Weapons or to the two existing treaties establishing regional nuclear-weapon-free zones, or to both of the above.

359. While not possessing nuclear weapons themselves, some of the non-nuclear-weapon States, through various arrangements, including regional military alliances, have associated themselves with respective nuclear-weapon States, thereby accepting the so-called "nuclear umbrella" as an element of their defence, and consider that in their circumstances nuclear deterrence is a means to prevent war, including nuclear war. Other non-nuclear-weapon States have excluded this option from their national security considerations and have taken the position that nuclear weapons would threaten the very survival of the human race if these weapons were ever used in a major conflict. Thus, different approaches to security have been pursued by different individual countries or groups of countries.

360. The United States and the Soviet Union have, in the process of seeking to strengthen their national security, built large stocks of nuclear weapons. Although China, France and the United Kingdom have relatively small numbers of these weapons, they also see nuclear weapons as making a fundamental contribution to their national security.

361. Other non-nuclear-weapon States question whether nuclear weapons contribute in a positive way to security and contend that their own security is threatened by the possibility of nuclear war, which, in their opinion, cannot be excluded as long as these weapons exist. In view of this these States hold that international peace and security cannot be fully guaranteed until the ultimate elimination of all nuclear weapons is attained. On their initiative, the General Assembly held its first special session devoted to disarmament in 1978, and adopted a Final Document that called upon all States, in particular the nuclear-weapon States, inter alia, to consider as soon as possible various proposals designed to secure the cessation of the nuclear arms race, the avoidance of the use of nuclear weapons and the prevention of nuclear war and thereby ensure that the survival of mankind is not endangered. 1/

362. Many proponents of the latter approach have renounced possession of nuclear weapons and pursue a policy of non-alignment or neutrality. In that context, they advocate alternative methods for strengthening international peace and security.

363. One of these methods is reflected in the concept of nuclear-weapon-free zones. The general objective of such arrangements would be to prevent the emergence of new nuclear-weapon States in the region concerned and to assure against nuclear attack on the countries comprising the zone, as well as to ensure generally the absence of nuclear weapons from the region, including their stationing. Many States believe that such zones offer the prospect of precluding nuclear weapons altogether from the considerations of the security of a region. It would be important to assure that there is no possibility of clandestine production or acquisition of nuclear weapons in such zones. Examples of successful regional agreements are the zones established in Latin America by the 1967 Treaty of Tlatelolco and in the South Pacific by the 1987 Treaty of Rarotonga (see chap. VIII).

364. A number of countries have advocated even broader approaches to regional security than nuclear-weapon-free zones. These are the concepts of "demilitarized zones" and "zones of peace". The 1959 Antarctic Treaty is the foremost example in the first case (see chap. VIII); in the second, discussions are taking place on the creation of zones of peace in the Indian Ocean, the Mediterranean and the South Atlantic.

365. In the 1980s, yet another approach to international security in the nuclear era emerged - the concept of common security. 2/ According to the concept, the key to security lies in the willingness of nations to organize their security policies in co-operation with each other. The proponents of this concept felt that this process of co-operation should begin with the improvement of relations between the two major Powers, the United States and the Soviet Union, and the respective military alliances they belong to. They further suggested that the rapprochement and normalization of relations between them should be combined with negotiations for conventional and nuclear arms limitation agreements, which are now taking place. In this process, in their opinion, close attention should also be paid to the problem of underdevelopment, which might have wider repercussions by causing wars and thereby destabilizing international peace and security. This sentiment was amplified further by the States that participated in the 1987 International

Conference on the Relationship between Disarmament and Development. The Final Document of that Conference noted that non-military threats to national security of States had moved to the forefront of global concern for international security. 3/

366. When discussing the question of international peace and security in the nuclear age, it is important to recall that the quantitative and qualitative growth of nuclear weapons has been chiefly a consequence of the long-standing tensions and distrust between East and West. The end of the decade of the 1980s has, however, seen a positive change in this relationship. The world is no longer bipolar but is rather moving in the direction of new multipolar political and economic relationships that could have a profound effect on international security. This trend is further reinforced by recent important progress and concrete results in the bilateral negotiations on nuclear weapons between the United States and the Soviet Union and in the negotiation on conventional weapons between NATO and the Warsaw Treaty Organization. Thus, there is a growing recognition that negotiated reductions to progressively lower levels of nuclear weapons are desirable and possible and that they have the most positive impact on international peace and the security of all.

B. International security and quantitative and qualitative development of nuclear weapons

367. The discussions of international security in the nuclear era have, generally speaking, focused on four specific aspects of the issue: (a) quantitative and qualitative developments of nuclear weapons by the nuclear-weapon States; (b) possible acquisition of nuclear weapons by additional States; (c) geographical spread of the deployment of nuclear weapons; and (d) the prevention of accidental use of nuclear weapons.

368. As far as the nuclear-weapon States are concerned, a central issue in these debates has been the question of quantitative and qualitative developments of their stockpiles. The two major Powers have long acquired the potential of inflicting unacceptable levels of destruction on each other. Their main concern since has been whether one side might acquire the potential to deny the other side the capability for a disarming first-strike. This concern has been responsible in large measure for the fuelling of the nuclear arms competition.

369. As an illustration of this phenomenon, it is pointed out that, according to academic sources, in 1967 the United States possessed some 4,500 strategic warheads while the Soviet Union had approximately 1,000. 4/ However, it is estimated that by 1990 these stockpiles may have increased up to 13,000 for the United States and 11,500 for the Soviet Union. 5/ This growth involved both quantitative and qualitative aspects (see chap. II).

370. The number of nuclear delivery vehicles and deployed warheads is expected to drop significantly as a result of the destruction of one whole category of nuclear weapons under the terms of the 1987 Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles (INF Treaty) and the anticipated reductions within the framework of the strategic arms reduction talks (START) expected to be concluded by

the end of 1990. At the same time, both major Powers are continuing to make technological improvements in the quality of their nuclear weapons.

371. For example, it is widely believed that the United States Trident-II missile, when deployed, would have about the same accuracy as the majority of currently deployed ICBMs. 6/ It is also expected that the Soviet SLBMs will attain comparable accuracy as well (see chap. III). Some analysts believe that both sides will have the capability of achieving a high probability of destruction of any hardened land targets. These developments are related to the perception that, owing to the survivability of SSBNs, their increased accuracy would only enhance nuclear deterrence.

372. There are those, however, who point out that the shorter flight times and accuracy of the SLBMs may increase fears of a surprise attack. They also note that the increased deployment of strategic cruise missiles, both ALCMs and SLCMs, may represent a further complicating factor because of their accuracy and the unpredictability of their flight patterns. 7/

373. In addition to developments in technology directly related to weapons (see chap. III), advances in other areas also have important implications for national strategic policies of those States which have those weapons. Improvements, for example, in the capability of the command, control and communication systems for the strategic nuclear forces include quicker and more accurate observation by satellites and radars, enabling enhanced warning of attack.

374. Making an overall assessment of the full implications of all the qualitative improvements is difficult since the various developments appear capable of both contributing to and weakening stability. Thus, for instance, in spite of the technological advances in the weapons industry, a pre-emptive strike against submarine-based missiles at sea or a strategic airforce that maintains a substantive airborne alert would not be effective.

375. As progress is made in the negotiations between the two major Powers regarding their nuclear strategic forces, more questions are likely to be asked with regard to the future of the nuclear weapons of the other nuclear-weapon States. These three States - China, France and the United Kingdom - although possessing significant nuclear weaponry, still have less than 10 per cent of the total nuclear weapons in the world. 8/

376. In the 1980s, China, France and the United Kingdom began to modernize and expand their nuclear forces. The United Kingdom plans to buy Trident missiles, which would greatly enhance the accuracy and destructive power of any single British SSBN. 9/ France has launched its own maritime and land-based nuclear weapon modernization programmes. It is estimated that both Powers will have the potential to deploy some 500 warheads on their SSBNs. 10/ China has also increased its nuclear forces, but not as much as France and the United Kingdom.

377. The position of the United Kingdom and France is that they could participate in negotiations on their nuclear weapons only if the overall threat to their national security was significantly reduced and, in particular, if the disparity

between the nuclear arsenals of the two principal nuclear Powers and their respective arsenals was substantially reduced. They believe, furthermore, that negotiations on nuclear-weapons could not be conducted without taking into consideration the threat of chemical weapons and conventional armaments.

378. China holds the view that the two major nuclear Powers should take the lead in halting the testing, qualitative development, production and deployment of all types of nuclear weapons and in drastically reducing and eliminating them. After that, a broadly representative international conference on nuclear disarmament, with the participation of all nuclear States, could be held to examine steps and measures for the complete elimination of all nuclear weapons.

C. International security and possible emergence of new nuclear-weapon States

379. Apart from the five, no other State in the world has been officially declared to be a nuclear-weapon State. In 1974, India detonated a nuclear device. While this explosion demonstrated India's capability to develop nuclear weapons eventually, India declared that it was carried out for peaceful purposes.

380. As already noted, an overwhelming number of non-nuclear-weapon States have also undertaken a formal commitment not to acquire nuclear weapons. Consequently, the discussion of various aspects of international security as related to this group of countries is limited to two basic issues: how to maintain an effective régime for non-proliferation of nuclear weapons without adversely affecting other, peaceful applications of nuclear technology; and how to bring into this régime all those countries which have not yet formally renounced the option of acquiring nuclear weapons, particularly those which are considered to have technical capability to do so or which may have such ambitions.

381. Under the terms of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), non-nuclear-weapon States parties agree to apply safeguards administered by the International Atomic Energy Agency (IAEA) to all their peaceful nuclear activities in order to ensure that fissionable material is not diverted to nuclear explosive purposes. As at February 1990, safeguards agreements were in force for 83 of the 138 non-nuclear-weapon States party to the NPT. Of these, 41 States have no nuclear activity and no nuclear material or facility in operation. Fifty-four non-nuclear-weapon States party to the NPT have not as yet concluded the required safeguards agreement pursuant to article III.4 of the Treaty. In 1989 the Agency applied safeguards in 42 non-nuclear-weapon States party to the NPT and in one State pursuant to the Tlatelolco Treaty. 11/

382. The Treaties of Tlatelolco and Rarotonga, respectively, also provide for IAEA safeguards. Some 18 of the 23 Latin American States party to the Treaty of Tlatelolco have concluded safeguards agreements with IAEA, as have two States with territories in the zone of application of this Treaty. Safeguards agreements under the NPT have been concluded with 8 of the 11 signatories of the Rarotonga Treaty. 12/

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383. IAEA also administers the original system of safeguards in accordance with its statute, whereby member States can accept safeguards on nuclear material in specific facilities or on particular quantities of nuclear material.

384. In recent years, there has been extensive debate about non-proliferation and the basis of nuclear trade in general. Because of the possible connection between peaceful and military nuclear technologies, nuclear facilities and international trade in nuclear materials are subject to a wide range of international controls to provide assurance that nuclear industries are not being used for development of nuclear weapons. States that are major nuclear suppliers have adopted the position that nuclear materials, technology and equipment that could be used for development of nuclear weapons should not be supplied without the recipient State agreeing to apply IAEA safeguards and accept other conditions. 13/ Some have adopted stringent national policies designed to seek specific assurances that nuclear co-operation would not lead or contribute to development of a nuclear-weapon capability. Other nuclear suppliers also require IAEA safeguards and the commitment by the recipient countries to peaceful uses for their nuclear exports. A number of States now require acceptance of so-called "full-scope" safeguards or adherence to the non-proliferation Treaty or another binding international commitment not to acquire nuclear weapons as a condition for significant nuclear co-operation.

385. At the end of 1989, 172 safeguards agreements were in force with 102 States. In 59 States with significant nuclear activities, 924 installations and related facilities were under safeguards or contained safeguarded materials at year-end 1989, including the five nuclear-weapon States, where safeguards were actually implemented in 8 nuclear installations. 14/

386. International consensus exists that, although measures are necessary to prevent the proliferation of nuclear weapons, all States have the right to develop nuclear energy for peaceful purposes. Concern has, however, been expressed by some that the conditions governing access to nuclear technology, equipment, material and services do not sufficiently recognize the fact that national security and development may depend initially on secure access to energy resources. Many States have criticized some policies of supplier States. Their objective in the international discussion of these issues is the search for an agreed basis whereby their desire for fullest access to technology for development is reconciled with the need to insure against the further spread of nuclear weapons.

387. As regards specifically the question of the acquisition of nuclear weapons by additional States, concerns have been expressed on different occasions and in various contexts, that some non-nuclear-weapon States might develop nuclear-weapon programmes. This concern was expressed particularly in connection with the so-called "threshold" States. Since many countries, most notably industrially highly developed ones and possibly some others, have both technical capability and resources to become nuclear-weapon States, but have not demonstrated any intention in that respect, the term "threshold" usually applies only to those countries which have in various ways demonstrated such intentions or are believed to be pursuing such an objective.

388. Notwithstanding these concerns, there has been no formal request to put in motion mechanisms envisaged under any of the existing non-proliferation arrangements with a view to clarifying the activities of the countries in question covered by such arrangements. In this connection, it should be noted that neither at the Third Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, in 1985, nor during the preparatory stages for the Fourth Review Conference taking place in August/September 1990 has the question of the possible non-compliance of the parties been formally raised. This is also the case regarding the formal discussions in IAEA as well as within the framework of the two regional nuclear-weapon-free zones.

389. The situation is different regarding the second group of countries, that is, those which are not covered by such arrangements. Several of them are located in areas affected by local tensions and mutual suspicions that have given rise to concerns that some of these countries might, in fact, be interested in or even actively pursuing a nuclear-weapon option.

390. The nuclear programmes of India and Pakistan have been the subject of international concern. Neither country is covered by the existing non-proliferation arrangements, although the Governments of both India and Pakistan have repeatedly reaffirmed their interest in peaceful aspects of nuclear technology only.

391. Two specific situations have, however, been formally brought to the attention of the United Nations. One concerns Israel and the other South Africa. Neither of these countries is a party to the existing arrangements regarding the non-proliferation of nuclear weapons and both maintain unsafeguarded nuclear installations.

392. The report on Israeli nuclear armament submitted to the General Assembly in 1987 restated the conclusion of the 1981 Study on Israeli nuclear armament, which noted that, although there was no conclusive proof that Israel possessed nuclear weapons, there was no doubt "that Israel, if it has not already crossed that threshold, has the capability to manufacture nuclear weapons within a very short time". 15/ Israel's official position in this respect is neither to confirm nor to deny its nuclear-weapon capability. Israel has, on various occasions, formally stated that it would not be the first to introduce nuclear we ons into the Middle East and that it does not co-operate on nuclear matters with South Africa. 16/

393. The report on South Africa's nuclear capability was submitted to the General Assembly in 1981. 17/ Among other conclusions, the report noted that South Africa had the technical capability to manufacture nuclear weapons and that its reactors and enrichment plants had not been placed under IAEA safeguards. Yearly since then, the General Assembly has passed a resolution requesting the Secretary-General to keep it informed regarding new developments in this connection. 18/ In August 1988, the Foreign Minister of South Africa declared that his country had the capability to make nuclear weapons. 19/ Nevertheless, there is no proof that South Africa has built any weapons yet. South Africa has discussed the possibility of acceding to the Non-Proliferation Treaty with the depositaries on a number of

occasions. At its 1990 session, the United Nations Disarmament Commission adopted by consensus a report on South Africa's nuclear capability. 20/

394. Since the beginning of the 1980s, another concern has been expressed in connection with the activities of the so-called "threshold" countries, namely, the possibility that they might also be developing ballistic missile technology. Such missiles provide the most dependable means of delivering nuclear weapons. The whole matter is further complicated by the fact that the missile technology has also many other military applications not related to nuclear-weapon capabilities as well as in the area of peaceful activities. Many States are acquiring this technology through foreign acquisitions or indigenous productions either for military or civilian purposes.

395. In recent times a number of States have taken steps on the national as well as on the multilateral level to curb the spread of ballistic missiles. In April 1987, Canada, France, the Federal Republic of Germany, Italy, Japan, the United Kingdom and the United States adopted a régime of parallel export controls designed to counter the proliferation of ballistic missiles or unmanned systems (such as cruise missiles) capable of delivering a 500 kg payload at least 300 km. This régime, entitled the Missile Technology Control Régime (MTCR), also controls export of various missile technologies such as guidance devices, individual rocket stages and re-entry vehicles. Importers of missile technology for approved programmes may be required to provide assurances to signatory nations that such technology will not be used for proscribed programmes. 21/ In the last year, Belgium, Luxembourg, Netherlands and Spain have joined and Australia announced its intention to join the MTCR.

396. In 1988, the Soviet Union and the United States started bilateral discussions on the problems of the proliferation of missile technology, and the United States has discussed the issue with other countries as part of its efforts to strengthen the international nuclear non-proliferation régime. The Soviet Union affirmed its support for the objectives of the MTCR in the Joint Statement issued on 4 June 1990 at the summit meeting between President Bush and President Gorbachev.

D. International security and geographical spread of nuclear weapons

397. The nuclear-weapon States maintain their nuclear forces in various deployment areas. Two of them - the United States and the Soviet Union - on the basis of bilateral or other arrangements, deploy their forces, including nuclear, at military bases and installations also on the territories of other States. The nuclear-weapon States also use the high seas and international air space for their ships and aircraft that carry on board nuclear weapons. Some of these ships and aircraft call on ports of other States and make stops at their airports. Thus, at any given time there are a number of nuclear weapons present in the areas beyond the national territory of the nuclear-weapon States themselves. Some aspects of this geographical spread of nuclear weapons have been the subject of continuing discussions and differences in positions.

398. The majority of non-nuclear-weapon States do not permit the deployment of nuclear weapons on their territory. For many of these States, this policy also applies to nuclear weapons on board ships and aircraft on visits to their territory. Many of them also express concern about the use of international waterways and airspace on the grounds that the presence of nuclear weapons there in various ways, such as through accidents, may endanger international security.

399. In addition, many non-nuclear-weapon States do not allow warships carrying nuclear weapons to pass through their internal waters so as not to participate in or assist the spread of nuclear weapons. They also do so in order to preclude the possibility of increasing regional tensions and to avoid the various hazards that may arise, particularly the exposure of their peoples to nuclear contamination at a time when they do not possess the material or technical capabilities to counter such dangers. To allow passage in such circumstances would constitute an evasion of their responsibility towards their peoples.

400. The position of the nuclear-weapon States on the issues raised reflects their different policies regarding the deployment of nuclear weapons. Thus, generally speaking, the nuclear-weapon States emphasize their rights under international law to free navigation of the high seas for their naval vessels, including those which may be carrying nuclear weapons, in accordance with the United Nations Convention on the Law of the Sea. 22/

401. A majority of the nuclear-weapon States maintain a policy of neither confirming nor denying (NCND) the presence of nuclear weapons on board their ships and aircraft in any particular place at any particular time. Of the approximately 14,600 nuclear warheads reportedly earmarked for naval and maritime deployment, 9,200 are on ballistic missiles deployed on submarines that would rarely be carried to foreign ports. The remaining 5,400 tactical and strategic weapons are the focus of the NCND issue. 23/

402. The United States says that the purpose of the policy, inter alia, is to "withhold from a potential enemy information that could be used against US forces in the event of a conflict". 24/

403. The policies of France and the United Kingdom are similar to that of the United States. To date China has not deployed tactical nuclear weapons on surface vessels.

404. The Soviet Union offered in 1988, on the basis of reciprocity with the United States and other nuclear Powers, to announce the presence or absence of nuclear weapons on board its naval vessels calling at foreign ports. 25/

405. Currently, the only way to determine whether a ship is actually carrying nuclear weapons is through on-site inspection, although there is a debate about the feasibility of determining the absence of nuclear weapons from a ship by remote sensing. 26/ As naval ships enjoy sovereign immunity and are exempt under international law from inspections and search by host Governments, States that accept NCND leave the determination of whether to dock to the discretion of the nuclear-weapon State.

406. In recent years there has been growing public opposition in many countries to visits of ships that may be carrying nuclear weapons. In addition, the policy of neither confirming nor denying makes it difficult to be certain whether or not naval vessels involved in accidents were armed with nuclear weapons.

407. Also, the difficulty to be certain whether or not naval vessels were armed with nuclear weapons owing to the NCND practice was referred to in resolution 170 (VIII) of the General Conference of the Latin-American Organization for the Proscription of Nuclear Weapons of 19 May 1983 within the context of information concerning the introduction of nuclear weapons during the course of the South Atlantic conflict in 1982.

408. Certain States have drawn up regulations concerning visits of nuclear-armed or nuclear-powered ships. In 1987, New Zealand adopted legislation stipulating that a visit would be granted only "if the Prime Minister is satisfied that the warships will not be carrying any nuclear explosive devices upon their entry into the internal waters of New Zealand". 27/ Thus a nuclear-capable ship can be admitted to New Zealand ports as long as it is not actually carrying nuclear weapons. Although New Zealand does not openly challenge NCND, but rather makes its own assessment of whether nuclear weapons are carried on a particular vessel, France, the United Kingdom and the United States have chosen not to propose warship visits to New Zealand.

409. In New Zealand's view, prohibiting nuclear-weapon-carrying and nuclear-powered ships emanates from its wish not to be defended by nuclear weapons and its belief that nuclear weapons do not have a role in the South Pacific (see chap. VIII regarding the Treaty of Rarotonga). However, because New Zealand's ship visit policy is based on particular regional security considerations, the New Zealand Government has declared repeatedly that it is not intended as a model for other States to follow. 28/

E. Prevention of accidental use of nuclear weapons

410. Since the early days of nuclear weapons, nuclear-weapon States have been interested in avoiding any unauthorized or accidental use of nuclear weapons. Many safeguards have been introduced by nuclear-weapon States either unilaterally or by agreement. The nuclear warheads themselves have been designed to preclude accidental detonation as a result of exposure to mechanical damage, heat, blast or radiation. Technical designs and procedural rules (see chap. III), have been developed to preserve effective control over nuclear weapons and related operations.

411. These efforts have been successful in the sense that no accidental or unauthorized nuclear-weapon explosion has occurred during the several decades in which up to 60,000 nuclear weapons have been handled. While nuclear weapons have been involved in a number of accidents, none of them has ever exploded.

412. Although the risks of intentional nuclear war between the two major military alliances are considered to be low and steadily decreasing, it is considered that accidents might initiate a nuclear war unintentionally. In its broadest sense, the

term accidental nuclear war would include any way a nuclear war could start in response to false signals, incorrect or misinterpreted information, an unauthorized, accidental or terrorist launch or uncontrolled escalation of a conventional conflict. Technical malfunctioning, human error or irrational decisions under stress could contribute to the risk.

1. Protective measures

413. As described in chapter II, the control of nuclear weapons has been highly centralized in all countries concerned. Complex procedures have been developed to secure continuous contact and authentic messages. Special control has been organized by nuclear-weapon States for weapons deployed outside their territory. One form of permissive action links (PAL) consists of a highly secure coded signal from the highest political level to be inserted in the weapons before they can be used. 29/

414. The hotline between Moscow and Washington was established in 1963 after the Cuban missile crisis in order to reduce the risk of nuclear war by accident, miscalculation or failure of communication. It has been improved several times. Similar hotlines have been established between Moscow and London, and Moscow and Paris. Several agreements between the United States and the Soviet Union have been concluded for the purpose of avoiding military confrontation and provocative behaviour and of giving advance notification before missiles are tested (see chap. VIII).

415. The positive effect of these measures, however, runs the risk of being counteracted by developments in nuclear weapons systems. As a consequence, further protective measures are needed. The most essential measures must be based on an evaluation of the command and control system.

2. Possible triggers to an accidental war

416. Improvements in satellite-based photo-reconnaissance, ballistic missile guidance, the introduction of multiple warheads on missiles and the development of anti-satellite systems tend to make nuclear weapons and the command and control system vulnerable to attack. With only a very limited part of its strategic nuclear forces one of the major nuclear-weapon Powers could conceivably knock out the command and control system of its adversary (a "decapitating" strike).

417. In a situation of perceived severe crisis, these developments could give a high premium on striking first or striking back when indications of enemy attack are received (launch on warning). There would then be only a very short time for information-handling, decision-making and launching, since an intercontinental missile has a flight time of about 30 minutes and a submarine-based missile could approach half of that. 30/

418. The command and control system is designed to enable the early detection and intepretation of any hostile acts so that an appropriate response can be made (see

chap. II). The increasing sophistication of nuclear weapons in terms of higher accuracy and reduced flight times has greatly increased the difficulty of producing an integrated system capable of ensuring firm political control and effective military use of such weapons. In the command and control system false signals occasionally occur that are sorted out by comparing indications from different sensors. In a crisis situation with a perceived immediate threat, false or misinterpreted signals, lost connections, unidentified use of weapons combined with short time for cross-checking and decision-making could lead to mistaken decisions and to accidental nuclear war. 31/

419. There have been numerous reports of false warnings due to various causes. They include misinterpretations caused by atmospheric disturbances, a meteorite shower, a flight of wild geese and a computer chip failure. 32/ In the systems used in the Soviet Union and the United States, however, any warning has to be confirmed by a second independent sensor system using a different physical technique for observation. 33/

420. The reliability of military electronics is an increasingly important problem. There are at least three general types of electronic failures that have been well documented. The first involves items of electronic hardware. The second involves problems of interference with the electromagnetic environment in which the military systems operate. The third type of electronic failure is manifest in computer software. The larger and more complex a computer programme becomes, the more difficult it is to have confidence in the programme working correctly under all possible conditions.

421. Both machines and humans may be fallible, especially in wartime conditions. Chaos, stress, sleep deprivation, isolation and even drug or alcohol abuse may cause inaccurate judgments. Nevertheless, thus far there have been no reported losses, thefts or detonations of nuclear devices as a result of these problems.

Notes

1/ See resolution S-10/2, para. 58. See also The United Nations Disarmament Yearbook, Volume 3, 1978 (United Nations publication, Sales No. E.79.XI.3).

2/ Common Security - A Blueprint For Survival, report of the Independent Commission on Disarmament Security Issues (A/CN.10/38).

3/ A/CONF.130/39.

4/ Comprehensive Study on Nuclear Weapons (United Nations publication, Sales No. E.81.I.11), para. 403.

5/ SIPRI Yearbook 1990: World Armaments and Disarmament, New York, Oxford University Press, 1990, pp. 14 and 16.

Notes (continued)

6/ Bernard Blake, ed., Jane's Weapons Systems 1988-89, Surrey, Jane's Information Group Ltd., 1984, pp. 30 and 906.

7/ See Charles A. Sorrels, US Cruise Missile Programs: Development, Deployment and Implications for Arms Control, Oxford, Brassey's Defence Publishers, Ltd., 1983, pp. 3, 4, 8 and 9. See also Richard K. Betts, ed., Cruise Missiles: Technology, Strategy and Politics, Washington, DC, The Brookings Institution, 1981.

8/ For British, French and Chinese totals, see SIPRI Yearbook, op. cit., pp. 20-23.

9/ See SIPRI Yearbook 1988, p. 47.

10/ For information on the British SSBN programme, see ibid. For information on the French programme, see SIPRI Yearbook 1989, p. 31 and SIPRI Yearbook 1988, p. 51.

11/ See NPT/CONF.IV/12. Nuclear-weapon States parties to the Treaty are not required to place their nuclear facilities under safeguards. Some civilian nuclear facilities in the five nuclear-weapon States are safeguarded under so-called "voluntary offer" agreements concluded with IAEA. The entry into force of these agreements are: United Kingdom, August 1978; United States, December 1980; France, September 1981; USSR, June 1985; and China, September 1989. IAEA safeguards are applied in nuclear-weapon States in a limited number of facilities selected by IAEA. See also Leonard Spector, The Undeclared Bomb, Cambridge, Ballinger Publishers, 1988, p. 73.

12/ IAEA News Features, special edition, Vienna, Austria, April 1990.

13/ The Nuclear Suppliers Group - Belgium, Canada, Czechoslovakia, France, Germany, Federal Republic of, German Democratic Republic, Italy, Japan, Netherlands, Poland, Sweden, Switzerland, USSR, United Kingdom and United States - notified IAEA in 1978 of common guidelines to be applied in the export of nuclear material equipment or technology. See also Spector, op. cit., pp. 9, 10, 315 and 316.

14/ IAEA News Features, special edition, Vienna, Austria, April 1990.

15/ See the report of the Secretary-General on Israeli nuclear armament (A/42/581), p. 2.

16/ United Nations Disarmament Yearbook, Vol. 12, 1987 (United Nations publication, Sales No. E.88.IX.2), chap. X.

17/ South Africa's plan and capability in the nuclear field (United Nations publication, Sales No. E.81.I.10).

Notes (continued)

18/ The resolutions were adopted with the following voting results: 40/89 A (148-0-6); 41/55 A (150-0-5); 42/34 A (151-0-4); 43/71 A (151-0-4); 44/113 A (147-0-4); 40/89 B (135-4-14); 41/55 B (139-4-13); 42/34 B (140-4-13); 43/71 B (138-4-12); and 44/113 B (137-4-1[illegible]).

19/ The New York Times, 14 August 1988, "Pretoria Says It Can Build A-Arms", p. A16. Botha was quoted at a Vienna press conference as saying "we have the capability to make one. We have the capability to do so, should we want to".

20/ Official Records of the General Assembly, Forty-fifth Session, Supplement No. 42 (A/45/42).

21/ See Josef Goldblat, Twenty Years of the Non-Proliferation Treaty, Implementation and Prospects, International Peace Research Institute, Oslo, 1990.

22/ See The Law of the Sea (United Nations publication, Sales No. E.83.V.5). Regarding territorial seas, see part II; regarding international navigation, see part III.

23/ Bulletin of the Atomic Scientists, Vol. 55, No. 7, September 1989, p. 48.

24/ R. Fieldhouse, ed., Security at Sea: Naval Forces and Arms Control, Oxford University Press, 1990, p. 247.

25/ Official Records of the General Assembly, Fifteenth Special Session, Supplement No. 2 (A/S-15/PV.12).

26/ At the same time, work is now in progress to find methods to detect with assurance the presence of nuclear weapons on board ships by means of distant verification equipment. In 1989, a joint experiment in the Black Sea was conducted by the USSR Academy of Sciences and the American private organization, the United States Natural Resource Defense Council, in co-operation with the Soviet navy. See Thomas B. Cochran, "Black Sea Experiment Only a Start", in Bulletin of the Atomic Scientists, Vol. 45, No. 9, November 1989, pp. 12-16. See also the technical report by Steven Fetter, Thomas B. Cochran, Lee Grodzins, Harvey Lynch and Martin Zucker, "Gamma-Ray Measurements of a Soviet Cruise-Missile Warhead" (April 1990 pre-publication draft from NRDC, forthcoming in Science).

27/ New Zealand Nuclear-Free-Zone, Disarmament, and Arms Control Act 1987 (No. 86), clause 9. In 1985 New Zealand had refused entry to the US destroyer USS Buchanan because its non-nuclear status was not guaranteed. This refusal resulted in the break-up of the ANZUS alliance (the security Treaty between Australia, New Zealand and the United States) in August 1987. Under the legislation a general prohibition also applies to nuclear-powered vessels.

28/ Prime Minister David Lange said in 1987 "You cannot simply export a model based on our own particular security considerations". Ministry of Foreign Affairs Press Statement No. 8, 19 June 1987, p. 12.

Notes (continued)

29/ See Donald R. Cotter, "Peacetime Operations: Safety and Security", in Ashton B. Carter, John D. Steinbruner and Charles A. Zraket, eds., Managing Nuclear Operations, Washington, DC, The Broookings Institution, 1987, pp. 46-51. See also Albert Wohlstetter and Richard Brody, "Continuing Control as a Requirement for Deterring", p. 168 in the same volume.

30/ See Thomas B. Cochran, William A. Arkin and Milton M. Hoenig, Nuclear Weapons Databook: Vol. 1, United States Nuclear Forces and Capabilities, Cambridge, Ballinger Publishers, 1984, p. 100. See also Theodore A. Postol, "Targeting", in Carter, et al., op. cit., p. 388, and Barry R. Schneider, Colin S. Gray and Keith B. Payne, eds., Missiles for the Nineties: ICBMs and Strategic Policy, Boulder, Westview Press, 1984, pp. 9 and 10.

31/ See Bruce G. Blair, "Alerting in Crisis and Conventional War", in Carter et al., op. cit., pp. 75-120.

32/ See John May, The Greenpeace Book of the Nuclear Age: The Hidden History, The Human Cost, New York, Pantheon/Greenpeace Communications Ltd., 1989.

33/ See Ashton B. Carter, "Sources of Error and Uncertainty", in Carter et al., op. cit., pp. 611-639.

CHAPTER VIII

NUCLEAR ARMS LIMITATION AND DISARMAMENT

A. Introduction

422. Since the dawn of the nuclear age almost half a century ago, efforts have been made in the world community to deal with the various implications of the existence of nuclear weapons. Many of them have been concerned with a wide range of specific measures aimed at the limitation, reduction and elimination of nuclear weapons and their delivery systems. Some others dealt with the prevention of the proliferation of nuclear weapons, cessation of nuclear-weapon tests, and the establishment of nuclear-weapon-free zones in various regions of the world. Some discussions focused also on the legal rules regarding possession and possible use of nuclear weapons.

423. Arms limitation and disarmament efforts have been pursued both within and outside the United Nations framework. The United States and the Soviet Union have considered a number of measures bilaterally, particularly those dealing with the limitations of their strategic arms and the elimination of their intermediate/medium-range nuclear missiles (INF). Many other efforts were undertaken in the regional as well as global context. Over the years, a number of agreements have been reached dealing with various aspects of nuclear weapons.

B. Constraints on the possession of nuclear weapons

424. Two different approaches developed with respect to imposing constraints on the acquisition of nuclear weapons. Both of them deal with the acquisition of nuclear weapons by non-nuclear-weapon States. One approach involved negotiations for a global treaty committing nuclear-weapon States not to transfer nuclear weapons and non-nuclear-weapon States not to acquire them. The other approach concerned the establishment of nuclear-weapon-free zones in various regions of the world. Although based on the same principle of non-acquisition of nuclear weapons, the latter approach encompasses additional constraints, both on nuclear and non-nuclear States parties to such zones and is, as such, broader in scope.

1. Treaty on the Non-Proliferation of Nuclear Weapons

425. The Non-Proliferation Treaty (resolution 2373 (XXII), annex) is regarded by many as an important achievement in the area of nuclear-arms regulation. The Treaty was opened for signature on 1 July 1968 and entered into force on 5 March 1970. Among the nuclear-weapon States, the Soviet Union, the United Kingdom and the United States are parties to the Treaty and serve as its depositaries. China and France, while not parties to the Treaty, have on various occasions stated that they do not support nuclear proliferation and would not act contrary to the Treaty's provisions. By the end of June 1990 the Treaty had 141 parties, making it the most widely accepted arms limitation instrument. A considerable number of non-nuclear-weapon States advanced in nuclear technology

have become parties to the Treaty. On the other hand, some such States have not yet become party to it.

426. The basic provisions of the Treaty are to: prevent the spread of nuclear weapons (arts. I and II); provide assurance, through international safeguards, that the peaceful nuclear activities of non-nuclear-weapon States will not be diverted to making such weapons (art. III); facilitate, to the maximum extent consistent with the other purposes of the Treaty, the peaceful uses of nuclear energy through full co-operation - with the potential benefits of any peaceful application of nuclear explosion technology being made available to non-nuclear parties under appropriate international observation (arts. IV and V); express the determination to pursue negotiations in good faith on effective measures relating to cessation of the nuclear-arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control (art. VI). The NPT also has considerable relevance to several other arms control and disarmament measures, e.g. a comprehensive nuclear-test ban, negative security assurances and nuclear-weapon-free zones.

427. The Treaty also contains provisions for periodic review of its operation (art. VIII). It also states that a conference shall be convened 25 years following the entry into force (i.e. in 1995) "to decide whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods" (art. X).

428. Three review conferences have been held so far: in 1975, 1980 and 1985. The Fourth Review Conference is scheduled to take place in August/September 1990. China and France have indicated their intention to attend as observers.

429. At the time of the Third Review Conference there were 131 parties to the Treaty. The strong convergence of interests of the nuclear and non-nuclear-weapon States parties to check the further spread of nuclear weapons provided a basis for the successful conclusion of the Conference with the adoption by consensus of a Final Document. This document, although critical of the implementation of the Treaty in some areas and recommending further strengthening of the international system for non-proliferation in others, confirmed unanimously the sustained validity of the fundamental aims of the Treaty and concluded that it continues to meet its basic objective. 1/

2. Nuclear-weapon-free zones

430. The idea of establishing nuclear-weapon-free zones as a means of keeping the regions concerned free of nuclear weapons began to attract the attention of the international community in the 1950s. Many proposals have been made since that time. While some of them are still being considered in various forums, agreement has been reached on two of them.

(a) Treaty of Rarotonga 2/

431. The South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga) was opened for signature on 6 August 1985 and entered into force on 11 December 1986. Eleven out of 15 members of the South Pacific Forum had become parties to the Treaty as at June 1990. The four countries that have not signed the Treaty are: Tonga, Vanuatu, the Federated States of Micronesia and the Republic of the Marshall Islands. The Treaty area encompasses large sea areas, but most provisions apply only on land and, consequently, nothing in the Treaty affects the exercise of the rights of any State under international law with regard to freedom of the seas.

432. The Treaty of Rarotonga creates a "nuclear-free", rather than a "nuclear-weapon-free", zone. The prime intention of the Treaty was to keep the region free of the stationing of nuclear weapons, nuclear testing and environmental pollution by radioactive waste. Moreover, the parties wished to prohibit all types of nuclear explosions. Accordingly, the operative articles of the Treaty refer consistently to "nuclear explosive devices", a term which covers all nuclear devices, irrespective of the purpose, military or peaceful, which has been given for their existence.

433. Each party to the Treaty undertakes not to manufacture, acquire, possess or have control over any nuclear explosive device inside or outside the zone. Moreover, it undertakes to conduct any nuclear co-operation with other States in accordance with strict non-proliferation measures to provide assurance of exclusively peaceful non-explosive use, and to support the effectiveness of the international non-proliferation system based on the Non-Proliferation Treaty and the safeguards system of IAEA. While exercising its sovereign rights to decide for itself whether to allow foreign ships (which may be nuclear-powered or nuclear-armed) to visit its ports or foreign aircraft to visit its airfields or fly over its territory, each party undertakes to prevent any nuclear explosive device from being stationed in its territory. It also undertakes to prevent all testing of such devices on its territory and not to assist others in doing so. It further undertakes not to dump radioactive wastes anywhere at sea within the zone and to prevent such dumping or storing by anyone in its territorial sea.

434. The States outside the zone that have jurisdiction over territories within it (France, the United Kingdom and the United States) would, upon becoming parties to Protocol 1, apply the Treaty's key provisions to those territories. The five nuclear-weapon States would, upon becoming parties to Protocol 2, undertake not to use or threaten to use nuclear explosive devices against parties to the Treaty, and any such State would, upon becoming party to Protocol 3, refrain from nuclear testing within the zone.

435. The Soviet Union and China have ratified Protocols 2 and 3. France, the United Kingdom and the United States have indicated that they do not intend at this time to become parties to any of the Protocols. However, the United States declared that none of its practices and activities within the Treaty area were inconsistent with the Treaty and its Protocols, while the United Kingdom stated that it would respect the intentions of States of the region on Protocols 1 and 3. 3/

436. South Pacific nations have expressed disappointment that France has not signed the Protocol 3 and continues to test within the zone. France put forward its position on this matter to the General Assembly on 2 June 1988. 4/

(b) Treaty of Tlatelolco 5/

437. The Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco) was the first treaty to establish a nuclear-weapon-free zone in a densely populated area. It was also the first agreement to establish a system of international control and a permanent supervisory organ, the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL).

438. The Treaty was signed on 14 February 1967, at Tlatelolco, a borough of Mexico City. The basic obligation of the parties to the Treaty, defined in article 1, is to use exclusively for peaceful purposes the nuclear material and facilities under their jurisdiction, and to prohibit and prevent in their respective territories the very presence of nuclear weapons for any purpose and under any circumstances. Parties to the Treaty also undertake to refrain from engaging in, encouraging or authorizing, directly or indirectly, or in any way participating in the testing, use, manufacture, production, possession or control of any nuclear weapons.

439. Annexed to the Treaty are two Additional Protocols, which create a system of obligations for extra-continental and continental States having responsibility de jure or de facto for territories in the zone of application of the Treaty as well as obligations for the nuclear-weapon States. Thus, under Additional Protocol I, France, the Netherlands, the United Kingdom and the United States would agree to guarantee nuclear-weapon-free status to those territories for which they are, de jure or de facto, internationally responsible. The Protocol has been signed and ratified by the Netherlands, the United Kingdom and the United States. France has signed it and has declared that it will in due course take an appropriate decision, considering that not all States concerned in the zone are yet parties to this Treaty. Under Additional Protocol II, nuclear-weapon States pledge to respect fully the "denuclearization of Latin America in respect of warlike purposes" and "not to use or threaten to use nuclear weapons against the Contracting Parties". By 1979, all five nuclear-weapon States had adhered to it, and in that connection made individual declarations with respect to various provisions of the Treaty and its Protocols. 6/

440. As at June 1990, the Treaty was in force for 23 Latin American States that had ratified it and had waived the requirements for entering into force set out in article 28 (that all States in the zone be parties to the Treaty, that all States to which the Protocols apply adhere to them and that relevant safeguards agreements be concluded with IAEA). Several States within the denuclearized zone are not yet parties to the Treaty, among them Cuba, which has not signed the Treaty. Argentina has signed but has not ratified it, and Brazil and Chile have ratified it but not waived the requirements for its entry into force. Argentina, as a signatory, has officially declared that it would not act against the objectives of the Treaty.

(c) Various proposals

441. The discussion of the question of establishing nuclear-weapon-free zones in various parts of the world is continuing between regional States concerned and within the United Nations disarmament bodies. While supporting the concept as such, many Member States stress the importance of certain prerequisites for the successful implementation of the concept of nuclear-weapon-free zones. Among the principles and objectives most referred to are the following: the initiative should come from the States in the region concerned and the arrangements to establish a nuclear-weapon-free zone should be based on agreement freely arrived at among the States of the prospective zone; the arrangements should take into account the specific characteristics of the region in question; such arrangements should contain provisions concerning verification of the commitments undertaken; the nuclear-weapon States should undertake obligations to respect the status of the denuclearized zone and not to use or threaten to use nuclear weapons against the States of the zone. In addition, some States judge proposals for such zones also from the standpoint of their potential contribution not only to the security of the region concerned, but to international security in general.

442. For many years, debates have taken place in the General Assembly on the possibility of setting up nuclear-weapon-free zones in Africa, 7/ the Middle East, 8/ and South Asia. 9/ In addition, there have been proposals for the creation of such zones in other regions, including Northern Europe, Central Europe, the Balkans and South-East Asia. Some exploratory work has been carried out both at the regional and international level on these possibilities. However, no concrete negotiations have yet been initiated on any of these proposals. Although there has been considerable support for some proposals, not all of them have received support by all countries concerned.

C. Limitation on stationing of nuclear weapons

443. Setting geographical limitations on the stationing of nuclear weapons is an approach to reducing the nuclear threat. Although there is no prohibition on deployment of nuclear weapons on the high seas, some States would like to have the seas used exclusively for peaceful and non-nuclear purposes. Others point to their rights to free navigation of the seas in customary law and under the United Nations Convention on the Law of the Sea. The agreements concluded so far in this respect, unlike nuclear-weapon-free zones, largely cover unpopulated territories on the Earth and in outer space. In one instance, the scope is also broader since it provides not only for denuclearization, but also demilitarization of the area.

1. The Antarctic Treaty

444. The Antarctic Treaty, concluded on 1 December 1959, was the first international agreement that, by establishing a demilitarized zone, ipso facto provided that nuclear weapons would not be introduced into a specified area. The Treaty bans "any measures of a military nature" such as the establishment of military bases and fortifications, military manoeuvres and the testing of any type

of weapon. This was the first Treaty to provide for on-site inspection. The Treaty entered into force on 23 June 1961 and the number of parties to it has increased from the original 12 signatories in 1959 to 39 as at the end of 1989, including the five nuclear-weapon States.

2. Outer Space Treaty

445. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty) (resolution 2222 (XXI), annex), was opened for signature on 27 January 1967 and entered into force on 10 October the same year. As at 31 December 1989, 91 States had become parties to the Treaty.

446. The Treaty prohibits the placing in orbit around the Earth of any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, installing such weapons on celestial bodies or stationing them in outer space in any other manner. The Treaty also affirms that the Moon and other celestial bodies are to be used exclusively for peaceful purposes and that the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies are to be prohibited.

447. A further instrument, the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, was concluded in 1979. It entered into force on 11 July 1984. By the end of 1989, seven countries (Australia, Austria, Chile, Netherlands, Pakistan, Philippines and Uruguay) had become parties to it. It complements the Outer Space Treaty and prohibits the use of force on the Moon, the placing of any weapons, including nuclear weapons, on or in orbit around it, or any kind of militarization of it or other celestial bodies.

3. Sea-Bed Treaty

448. The Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof (Sea-Bed Treaty) (resolution 2660 (XXV), annex) was opened for signature on 11 February 1971. It entered into force on 18 May 1972. By the end of December 1989, 82 States had ratified the Treaty while 23 States had signed it but not yet ratified it.

449. The Treaty provides that the States parties to it undertake not to place on or under the sea-bed, beyond the outer limit of a 12-mile coastal zone, any nuclear weapons or any other weapons of mass destruction or any facilities for such weapons. All parties have the right to verify through observation activities of other States in the area covered by the Treaty.

450. Three Review Conferences of the parties to the Treaty have been held so far, in 1977, 1983 and 1989. At all three Review Conferences, the parties reaffirmed their commitment to the Treaty. In addition, at the general debate at the Third

Conference, the Soviet Union, the United Kingdom and the United States for the first time declared that they "have not emplaced any nuclear weapons or other weapons of mass destruction on the sea-bed outside the zone of application of the Treaty as defined by its article II and have no intention to do so". 10/

D. Limitations and reductions of nuclear weapons

451. There have been a number of efforts to limit and reduce the stockpiles of nuclear weapons in the world. While the consideration of these issues took place both within the United Nations and the Conference on Disarmament, where nuclear disarmament is viewed as a priority item on their respective agendas, the actual negotiations on a number of specific measures were pursued in bilateral negotiations between the United States and the Soviet Union. In the process, these two nuclear-weapon Powers have concluded several agreements providing for quantitative limitations and some qualitative restrictions on their nuclear forces.

452. During the 1970s the bilateral negotiations between the Soviet Union and the United States were carried out within the framework of the so-called strategic arms limitation talks (SALT), which resulted in the signing of several specific agreements. The negotiations continued in the early 1980s under a new name of the strategic arms reduction talks (START). In their joint statement of January 1985, the two sides defined their subject as a complex of questions concerning space and nuclear weapons, both strategic and intermediate/medium-range, with all the questions to be considered and resolved in their interrelationships. The statement also pointed out that "ultimately the forthcoming negotiations, just as efforts in general to limit and reduce arms, should lead to the complete elimination of nuclear arms everywhere". 11/

453. Under the general umbrella entitled nuclear and space talks (NST), the negotiations have been conducted in three different groups assigned to deal respectively with strategic nuclear weapons, intermediate/medium-range nuclear weapons, and defence and space issues. In the course of those negotiations, a great deal of progress has been achieved.

1. INF Treaty

454. A most significant result of bilateral efforts was achieved in 1987 with the conclusion of the Treaty between the United States of America and the Union of Soviet Socialist Republics on the Elimination of their Intermediate-Range and Shorter-Range Missiles (INF Treaty). 12/ The Treaty is notable because it provides, for the first time, for the complete elimination of an entire class of American and Soviet nuclear missiles and because it contains unprecedented intrusive verification provisions. It was signed in Washington by President Reagan and General Secretary Gorbachev on 7 December 1987 and came into force on 1 June 1988. The Treaty is of unlimited duration.

455. In the preamble, the parties expressed their conviction that the measures set forth in the Treaty would help to reduce the risk of an outbreak of war. They also recalled their obligations under article VI of the Treaty on the Non-Proliferation

of Nuclear Weapons, namely to pursue negotiations in good faith on effective measures for the cessation of the nuclear-arms race at an early date.

456. The basic obligation of the two parties consists of an undertaking to eliminate their intermediate-range and shorter-range missiles, together with their launchers, all support structures and support equipment. Intermediate-range missiles (1,000-5,500 km) would be eliminated not later than three years after the entry into force of the Treaty, while the elimination of shorter-range missiles (500-1,000 km) would be completed not later than 18 months after the Treaty's entry into force. The Protocol on Elimination provides that the nuclear warheads and guidance elements may be removed from the missiles, prior to their elimination, and retained by the deploying country.

457. The verification system of the Treaty provides, inter alia, for on-site inspection and inspection on short notice, and provides for non-interference with national technical means of verification. The on-site inspection covers the main facility of each side where components for missiles are being produced, i.e. the Votkinsk Machine Building Plant in the Soviet Union and the Hercules Plant in Utah in the United States. While intermediate-range missiles are prohibited, the Votkinsk plant also produces another type of missile that is also monitored. After two years of monitoring at both plants, if no such missiles are produced for 12 months, the monitoring portals will be removed and may not be replaced. Inspection on short notice applies to all specified sites other than production facilities. The inspectors are to be allowed to carry out such inspections not only during the initial 3-year period envisaged for complete elimination of these weapons, but also during the next 10 years, thus extending the duration of the whole arrangement to 13 years altogether. Furthermore, the actual removal of the weapons covered by the Treaty from deployment areas and storage is subject to verification. Besides missile installations on American and Soviet soil, this includes American and Soviet missile bases in Western and Eastern Europe. 13/ Occasional inspection of the locations will take place also over a 13-year period.

458. Following the conclusion of the INF Treaty, the Warsaw Treaty States proposed in April 1989 negotiations on tactical nuclear arms in Europe (see A/44/228). Those States were convinced that along with the elimination of the intermediate-range and shorter-range missiles, the phased reduction and eventual elimination of the tactical nuclear arms in Europe would help to lessen the danger of war, strengthen confidence and establish a more stable situation on the continent. This would, in their opinion, facilitate progress towards deep cuts in strategic nuclear arms and, ultimately, the complete elimination of nuclear weapons everywhere.

459. The member States of NATO, in their report entitled "A Comprehensive Concept of Arms Control and Disarmament" adopted at the NATO summit meeting in May 1989 (A/44/481, annex II), declared that once implementation of an agreement on conventional force reductions in Europe was under way, the United States, in consultation with the allies concerned, was prepared to enter into negotiations to achieve a partial reduction of American and Soviet land-based nuclear missile forces of shorter range to equal and verifiable levels. In April 1990, NATO agreed that negotiations on tactical nuclear weapons could start after the conclusion of an agreement on conventional force reductions in Europe. 14/

460. Pursuant to NATO decisions taken in 1979 and 1983, the United States unilaterally withdrew 35 per cent, i.e. 2,400, of its nuclear weapons based in Western Europe. The Soviet Union, in the course of 1989, also unilaterally withdrew 500 tactical nuclear warheads from the territory of its allies. The Soviet Union furthermore declared that it was prepared to withdraw during 1989-1991 all nuclear ammunition from the territories of its allies on the condition of a similar reciprocal step on the part of the United States. In June 1990, the Soviet Union announced that by the end of 1990 it would unilaterally reduce in the European region 140 short-range missile launchers as well as 3,200 pieces of nuclear artillery and 1,500 nuclear charges.

2. Strategic arms reduction talks

461. The United States and the Soviet Union are in the process of finalizing an agreement on substantial reductions of their strategic nuclear arsenals, the so-called START agreement. In June 1990, Presidents Bush and Gorbachev on the occasion of their summit meeting at Washington issued a joint statement outlining the basic provisions of the future treaty. The two sides will translate the agreed outline into specific treaty language. It is their declared intention to complete this work within months.

462. The Treaty would provide for both sides to carry out up to 50 per cent reductions in certain categories of strategic offensive arms. The Treaty would also include a reduction in the overall number of warheads deployed on delivery vehicles (ICBMs, SLBMs, heavy bombers) to no more than 1,600. The aggregate throw-weight of the deployed ICBMs and SLBMs of each side will be limited to 50 per cent below the present level of the Soviet Union. Heavy bombers equipped for long-range nuclear ALCMs will be counted as one delivery vehicle against the 1,600 limit and shall be attributed with an agreed number of warheads against the 6,000 limit. Existing and future United States heavy bombers equipped for long-range nuclear ALCMs will be attributed with 10 warheads each. Existing and future Soviet heavy bombers equipped for long-range nuclear ALCMs will be attributed with eight warheads each.

463. The Treaty will also include specific prohibitions on certain categories of strategic offensive arms, basing modes and activities. The following items would be banned: new types of heavy ICBMs; heavy SLBMs and launchers for heavy SLBMs; mobile launchers for heavy ICBMs; new types of ICBMs and SLBMs with more than 10 re-entry vehicles; flight testing and deployment of existing types of ICBMs or SLBMs with a number of re-entry vehicles greater than the number specified in the Washington Summit Joint Statement of December 1987; rapid reload of ICBM launchers; long-range nuclear ALCMs equipped with multiple independently targetable warheads. Sea-launched cruise missiles (SLCMs) will not be constrained in the START treaty. On the other hand, each side will provide the other with unilateral, politically binding declarations regarding its planned deployment of nuclear SLCMs with a range over 600 km. The maximum number of deployed SLCMs for each of the following five treaty years will not exceed 880 for each side.

464. The verification régime for the reductions and other constraints to be contained in the treaty would include on-site inspections; national technical means

of verification; a ban on denial of telemetric information; data-information exchange on numbers, locations and technical characteristics of strategic arms and an agreement on the manner of deployment of mobile ICBMs and limitations on their movements so as to ensure effective verification. A joint compliance and inspection commission will be established to promote the objectives of the treaty. The treaty would have a duration of 15 years with the possibility of extension for successive five-year periods.

3. Strategic arms limitation talks

465. Although new arrangements on strategic armaments, most notably the forthcoming START treaty, would go much farther than previous treaties, the strategic arms limitation talks (SALT) between the United States and the Soviet Union in the 1970s have played an important role in the efforts of the two sides to place certain limitations on the development of their nuclear-weapon arsenals.

466. Thus, by the Interim Agreement between the United States of America and the Union of Soviet Socialist Republics on certain measures with respect to the limitation of strategic offensive arms (SALT I), 15/ with a Protocol attached, the two sides undertook not to start construction of additional fixed land-based ballistic missile launchers and to limit submarine missile launchers and modern ballistic missile submarines to an agreed level for each side. The limits agreed upon allowed, however, for an additional increase in the total number of the strategic forces of the two sides. However, the SALT II agreement, signed in June 1979, set totals not only on missiles, but also on sub-category totals. The ceilings agreed upon went quite a way towards dealing with the very different needs of the United States, which had most of its warheads on submarines in the form of SLBMs, and the Soviet Union, which had most of its strategic assets in ICBM silos. It brought the long-range bomber forces into the calculations and even considered the new technology of air-launched cruise missiles (ALCMs). It did not reduce the number of warheads either side had, or restrict the use of any existing technology, but it did restrict major new technological developments and set some predictability in the strategic selection. It also served to work out many definitions and issues that were carried over into subsequent negotiations, such as START. 16/ Although the SALT II Treaty 17/ has not been formally ratified, both parties have in general observed the limitations set by it. These limitations will, however, be largely superseded by the terms envisaged under the START agreement.

467. Another important agreement concluded in the framework of SALT negotiations was the 1972 Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty), 18/ subsequently amended by a Protocol of 3 July 1974. By the ABM Treaty, the Soviet Union and the United States undertook not to develop, test or deploy mobile land- or sea-based, air- or space-based ABM systems. They also agreed to limit ABM systems to two sites with no more than 100 launchers at each site. In 1974, the Treaty was amended by a Protocol that limited each side to one ABM

deployment area only. The Soviet Union chose to maintain its ABM system in the area centred on its capital, Moscow, and the United States chose to maintain its system in the ICBM deployment area in North Dakota. Subsequently, the United States decided not to deploy its ABM system at all.

468. The ABM Treaty received considerable attention in the bilateral negotiations following the announcement of the United States strategic defense initiative (SDI) in 1983 (see chap. III, sect. D). The Soviet Union took the position that the provisions of the ABM Treaty prohibited all testing of ballistic missile defence systems and their components in outer space. For its part, the United States has maintained the position that the SDI research programme is not incompatible with the ABM Treaty.

469. Besides different interpretations of the relationship between SDI and ABM Treaty, the Soviet Union and the United States disagreed on the effect that such a programme, if and when fully developed, might have on the strategic balance between the two sides. The United States views it as an entirely defensive programme with no effect on START, while the Soviet Union held the view that the programme if implemented would deny it second strike retaliatory capability, the preservation of which for both sides constitutes the essence of the ABM Treaty. In September 1989, the Soviet Union expressed its willingness to sign and to ratify the START treaty without waiting for the completion of bilateral discussions of the ABM problem. At the same time, it proceeds from the assumption that both sides will continue to comply with the existing ABM Treaty as signed, and that its violation by any side would automatically relieve the other side from its obligations under the START treaty. The United States and the Soviet Union have also declared their commitment to work towards early and effective agreements aimed at preventing an arms race in space and terminating it on Earth.

470. The question of outer space first became the subject of bilateral negotiations between the United States and the Soviet Union in the 1970s. The initial discussions took place from 1977 to 1979 and focused on the question of anti-satellite activities. In August 1983, the Soviet Union proposed to the United States to ban ASAT systems and to eliminate existing ones, but the United States did not agree to this proposal. The new bilateral negotiations began in 1985 as part of the nuclear and space talks (NST), which also included START and INF as separate negotiations. At the Washington summit meeting in May/June 1990, both sides agreed to continue negotiations on ABM and space within the negotiating framework of NST.

E. Limitation on testing of nuclear explosive devices

471. Since nuclear testing is an inherent part of the process of development of nuclear weapons, many States have given highest priority to a comprehensive nuclear-test ban (CTB), i.e. a prohibition of all tests, in all environments. They point out that such a ban would introduce uncertainties in the qualitative development of nuclear weapons that would make the development of these weapons more difficult; that it would also largely prevent the acquisition of nuclear weapons by States that do not have them; and that it would therefore contribute to

the goal of nuclear non-proliferation. Nuclear-weapon States, with the exception of the Soviet Union, are not prepared to accept a nuclear-test ban, because they assess nuclear testing as essential for the credibility, reliability and survivability of their nuclear deterrent forces. The United States has stated that a CTB remains a long-term United States objective and that such a ban must be viewed in the context of a time when the United States no longer needs to depend on nuclear deterrence to ensure international security and stability, and when it has achieved broad, deep and verifiable arms reductions, greatly improved verification capabilities, expanded confidence-building measures and greater balance in conventional forces.

472. In 1963 the Soviet Union, the United Kingdom and the United States concluded a Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water. 19/ The Treaty was negotiated in response to environmental and other concerns being expressed at the time. It does not prohibit underground tests provided they do not cause radioactive debris to be present outside the territory of the State where the test was conducted. In its preamble, however, it notes the objective of achieving "the discontinuance of all test explosions of nuclear weapons for all time". The Treaty has since been joined by many other States and had, as at June 1990, 118 parties. Two nuclear-weapon States, France and China, are not parties, although they announced, in 1974 and 1986 respectively, that their future tests would be carried out only underground. 20/ France has stated that it is not prepared to enter any comprehensive test-ban agreement, although President Mitterrand has recently indicated that France would not be the last to stop testing. China stated that it was flexible towards the creation of the subsidiary body in the Conference on Disarmament on the issue. It also stated that if and when an agreement was reached on a mandate enabling such a body to be established, it would participate in its work. 21/

473. In 1974, the United States and the Soviet Union signed the so-called Threshold Test Ban Treaty (TTBT), which prohibits all weapon tests with a yield exceeding 150 kilotons. Because it is impossible to distinguish nuclear-weapons tests from nuclear explosions for peaceful purposes, in 1976, both States also signed the Peaceful Nuclear Explosions Treaty (PNET), 22/ which puts a 150-kiloton limit on such explosions. Difficulties arose in connection with verification procedures for both Treaties and, therefore, neither Treaty was ratified. In 19[illegible] the United States and the Soviet Union agreed to a step-by-step approach to the objective of the ultimate cessation of all testing and in that context initiated negotiations on improved verification procedures for those Treaties. Following the successful conclusion of those negotiations, during the Washington summit meeting in May/June 1990, the Soviet Union and the United States signed verification protocols for both Treaties, which will pave the way for their ratification by the respective legislative bodies of the two countries.

474. International efforts to achieve a complete test ban began in the 1950s. From 1977 to 1980, three nuclear-weapon States, the Soviet Union, the United Kingdom and the United States, held negotiations on a comprehensive test ban without reaching final agreement. The Conference on Disarmament at Geneva was periodically informed on the progress of these trilateral negotiations.

475. Most States have taken the position that the step-by-step approach agreed on by the United States and the Soviet Union is insufficient because it does not specify when a comprehensive ban is to be achieved. They continue to call for an immediate ban on all testing. At the United Nations, General Assembly resolutions attaching the highest priority to the conclusion of a comprehensive nuclear-test ban have been voted on and adopted by an overwhelming majority. The Conference on Disarmament has been requested by the Assembly in successive years to begin negotiations on such a treaty. Some States have submitted draft treaties and different proposals on this subject to the Conference on Disarmament, but no negotiations have been initiated. Given their position on the issue, most nuclear-weapon States remain opposed to the commencement of multilateral negotiations towards a CTBT in the Conference on Disarmament. At the same time, they have stated their readiness to discuss issues related to such a ban on a non-negotiating basis.

476. Recently, some States parties to the PTBT have proposed amending the Treaty into a comprehensive test ban. In accordance with the amendment procedure provided for in the Treaty, any amendment requires the consent of all three original parties. 23/ A meeting for the organization of the conference was held from 29 May to 8 June 1990 and adopted a number of organizational decisions. The Amendment Conference is scheduled to be held at New York from 7 to 18 January 1991, although two of the original parties, the United States and the United Kingdom, have already stated that they will oppose the proposed amendment.

477. Stating that it would uphold the idea of a CTB and that it wishes to promote it by practical steps, the Soviet Union held a unilateral moratorium on nuclear tests for 18 months in 1985-1987. No other nuclear-weapon State followed the Soviet Union's move.

478. As noted before, bans on testing have also been included in the two nuclear-weapon-free zone Treaties. The Treaty of Tlatelolco prohibits weapons testing in Latin America and the Caribbean. In view of their expressed concerns about nuclear weaponry and about the possible environmental effects of testing, the parties to the Treaty of Rarotonga undertook to prevent the testing of any nuclear explosive device in their territories and throughout the zone, and not to assist or encourage the testing of any such device by any State.

479. The verification aspects of a comprehensive test ban have received considerable attention. A variety of means, including satellite data and radiation monitoring, have allowed the international community to verify adherence to the ban on atmospheric tests. Underground testing has traditionally been monitored using seismic techniques although other techniques have been devised as a complement. Efforts are being made in the Conference on Disarmament to design a global seismic network for acquisition and exchange of data. Many believe that seismic monitoring, backed up by other methods, could detect and identify tests down to very low yields (1-2 kilotons) and that this testing threshold would impose severe constraints on nuclear-weapons development. However, there is some concern that no verification system would be able to detect sub-kiloton explosions.

480. The verification arrangements agreed upon in the verification protocols to the TTBT and the PNET, signed at the Washington summit meeting in May/June 1990,

include hydrodynamic yield measurement (the so-called CORRTEX method), on-site inspection and seismic monitoring on the territory of the testing party as well as national technical means.

F. Constraints on the use of nuclear weapons

481. Over the years, many initiatives have been put forward concerning the prohibition or limitation of the use of nuclear weapons. In the process, various approaches developed on this issue. They ranged from the calls for unconditional prohibition of the use of nuclear weapons to prohibition of first use and various conditional bans. After the conclusion of the 1968 Treaty on the Non-Proliferation of Nuclear Weapons, the question of adequate security assurances to non-nuclear-weapon States against the use of nuclear weapons emerged. Such guarantees were also contemplated within the framework of the establishment of nuclear-weapon-free zones in various regions of the world. Still another approach dealt with the limitation of the use of nuclear weapons from the point of view of customary norms of international humanitarian law in conventional wars as the basis for deriving some principles applicable to nuclear weapons as well. The question of the prohibition of the use of nuclear weapons was also considered within the broader question of the prevention of war, in particular nuclear war. This approach gained prominence especially during the 1980s.

482. No tangible progress has been made towards the conclusion of an agreement regarding the non-use of nuclear weapons. Many nations have expressed the hope that the depth and scope of changes presently taking place in international relations, particularly between the two major nuclear-weapon States, has considerably diminished the likelihood of their possible deliberate use.

483. The main thrust of various approaches to this issue, particularly those pursued in the last decade, are described briefly below.

1. Consideration in the General Assembly

484. The General Assembly has passed a great number of resolutions on this subject. With the exception of procedural resolutions, all resolutions have been adopted by vote. The voting has shown deeply rooted divergencies, reflecting different strategic doctrines and national security perceptions.

485. The question of the use of nuclear weapons received a great deal of attention at the 1978 special session of the General Assembly devoted to disarmament in a broader context of the elimination of the danger of war. At that session, the five nuclear-weapon States made individual declarations with regard to security assurances to non-nuclear-weapon States. 24/

486. At the second special session of the General Assembly devoted to disarmament, in 1982, various suggestions and proposals were put forward. The Soviet Union, for instance, declared that, with immediate effect, it assumed an obligation not to be the first to use nuclear weapons, because it believed that should a nuclear war

start it could mean the destruction of humankind. A similar statement already had been made by China in 1964 when it exploded its first atomic weapon.

487. The United Kingdom, also at the second special session on disarmament, stated that it was its long-established policy that nuclear weapons should never be used except in self-defence under most extreme circumstances. 25/

488. In the consideration of the issue, the United States and other Western countries pointed out that a declaration on the non-first use of nuclear weapons would restrict and undermine the wider principle of self-defence enshrined in the Charter of the United Nations. They noted that the Charter provided that States refrain from the threat or use of force in their international relations (Art. 2.4) but that it did not impair the inherent right of individual or collective self-defence if an armed attack occurs (Art. 51), and it did not contain any prohibition of any specific means of warfare.

489. At its thirty-seventh session and subsequently, in resolutions initiated by Argentina, the German Democratic Republic and India, the General Assembly, respectively recommended that the Conference on Disarmament undertake negotiations on: appropriate and practical measures that could be negotiated and adopted individually for the prevention of nuclear war; 26/ an international instrument of a legally binding character laying down the obligation not to be the first to use nuclear weapons; 27/ and an international convention prohibiting the use or threat of use of nuclear weapons under any circumstances, taking as a basis the text of a draft convention annexed to it. 28/

2. Actions and statements outside the United Nations

490. In 1984, for the first time, the Conference on Disarmament included in its agenda a separate item entitled "Prevention of nuclear war, including all related matters". While all members recognized the importance of the prevention of nuclear war, there remained differences in approach between various groups. Eastern European and non-aligned States, believing that the removal of the threat of nuclear war was the most urgent task, urged the Conference to undertake, as a matter of highest priority, negotiations on measures for the prevention of nuclear war and to establish an ad hoc committee for that purpose. For their part, Western countries maintained that the question of preventing nuclear war could not be isolated from the problem of preventing war in general and that the question at issue was how to maintain peace and international security in the nuclear age. As a result of these differences in approach, matters related to the non-use of nuclear weapons and prevention of nuclear war have continued until now to be considered only in plenary meetings of the Conference.

491. The question of constraints on the use of nuclear weapons and the prevention of nuclear war was also addressed on several occasions by various world leaders. Their statements have made an impact on the deliberations and negotiations in various forums.

492. For instance, the joint message of 24 October 1985 by the Heads of State or Government of six countries - Argentina, Greece, India, Mexico, Sweden and the United Republic of Tanzania - (the so-called "Six-Nation Initiative") directed to the leaders of the United States and the Soviet Union in connection with their summit meeting stated that "since the citizens of all nations are equally threatened by the consequences of nuclear war, it is of utmost importance to us also that your meeting should create appropriate conditions and produce concrete steps towards disarmament and peace" (A/40/825-S/17596, annex).

493. The United States-Soviet joint statement issued on 21 November 1985 on the occasion of the summit meeting between President Reagan and General Secretary Gorbachev stated that the two leaders, conscious of the special responsibilities of their respective countries for maintaining peace, "have agreed that a nuclear war cannot be won and must never be fought" (A/40/1070, annex). Furthermore, "they emphasized the importance of preventing any war between them, whether nuclear or conventional" and stated that they would not seek to achieve military superiority. In the joint statement issued at Washington on 10 December 1987, (A/43/58, annex) following their signing of the INF Treaty, President Reagan and General Secretary Gorbachev affirmed the fundamental importance of their meetings at Geneva (1985) and Reykjavik (1986), which had laid the basis for concrete steps in a process intended "to improve strategic stability and reduce the risk of conflict".

494. In February 1988, the six nations issued the Stockholm Declaration, in which they welcomed the signing of the INF Treaty (A/43/125-S/19478, annex). They viewed it as a "historic first step" and as significant evidence that "a reversal is possible". They also pointed out that no nation had the right to use nuclear weapons and declared that "what is morally wrong should also be explicitly prohibited by international law through a binding international agreement".

495. At the special ministerial meeting of the Non-Aligned Countries held at Havana in May 1988, the Final Communiqué stated (A/S-15/27, annex, para. 18):

> "The Ministers emphasized that, pending the attainment of general and complete disarmament - a process in which nuclear disarmament plays a central role - it was necessary for nuclear-weapon States, inter alia, immediately to negotiate an agreement on the prohibition of the use or the threat of use of nuclear weapons and to pledge not to be the first to use them. The Ministers further urged that non-nuclear-weapon States be given assurances against the threat or use of nuclear weapons by any nuclear-weapon State."

The Declaration issued at the Conference of Heads of State or Government of Non-Aligned Countries at Belgrade in September 1989 (see A/44/551-S/20870, annex) said:

> "The USSR and the USA have, for the first time in history, signed a treaty to eliminate some of the existing nuclear weapons. The Heads of State or Government welcomed this step and reiterated their expectation that it would be a precursor to the adoption of concrete disarmament measures leading to the complete elimination of nuclear weapons."

3. Security assurances

496. The question of security assurances to non-nuclear-weapon States was first raised specifically in connection with the negotiations at the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT).

497. In order to provide a counterbalance to the undertaking of the non-nuclear-weapon States not to acquire nuclear weapons, as embodied in the Non-Proliferation Treaty, three nuclear-weapon States - the Soviet Union, the United Kingdom and the United States - agreed to provide certain security assurances to these countries through a Security Council resolution.

498. Security Council resolution 255 (1968) recognized that aggression with nuclear weapons, or the threat thereof, against a non-nuclear-weapon State party to the Treaty would call for immediate action by the Council and, above all, by its nuclear-weapon States permanent members. The Council also welcomed the intention expressed by certain States to assist any non-nuclear-weapon State party to the Non-Proliferation Treaty that was a victim of an act or threat of nuclear aggression and reaffirmed the right to collective self-defence under Article 51 of the Charter of the United Nations.

499. However, a number of non-nuclear-weapon States, while welcoming the "positive" assurance provided for in the resolution, expressed preference for "negative" assurance, i.e. a commitment by nuclear-weapon States that they would not use or threaten to use nuclear weapons against non-nuclear-weapon States. All five nuclear-weapon States have provided unilateral negative security assurances, although those assurances reflect the different security perceptions of the nuclear-weapon States. 29/

500. The question has been actively considered by the Conference on Disarmament. Each year since 1979, with only one exception, 1986, the Conference on Disarmament has established ad hoc working bodies on effective international arrangements to assure non-nuclear-weapon States against the use or threat of use of nuclear weapons. Although there has been no objection in principle to the idea of an international convention, the difficulties involved as regards developing a "common formula" on the substance of security assurances, which would be acceptable to all States, have also been pointed out.

501. In recent years, the search for a common formula in the ad hoc committee on the nature and scope of security assurances has focused on the consideration of various new ideas put forward on the understanding that an agreement on the substance of the arrangements would facilitate the agreement on their form. Two basic approaches have been examined at the Conference on Disarmament negotiations - the single common formula and the "categorizational approach". The former seeks to find one common formula of security assurances covering all non-nuclear-weapon States which are to be assured. The latter envisages that a specific common formula should be developed for each category of non-nuclear-weapon States, which, in order to take into account the diversity of their security situations, are categorized along the lines of certain criteria (such as non-nuclear status, non-stationing of nuclear weapons, alliance status) as already reflected in the

unilateral declarations of the nuclear-weapon States. The idea of following a step-by-step approach has also been advanced, with the understanding that, when viewed in a broader perspective, the two basic approaches could complement each other. Various views on the suggested approaches have been expressed at the negotiations in the Conference on Disarmament and their consideration remains inconclusive. 30/ In November 1989, Nigeria submitted for consideration by the States parties to the Non-Proliferation Treaty a proposal for an agreement on the prohibition of the use or threat of use of nuclear weapons against non-nuclear-weapon States parties to that Treaty. The proposal was also submitted to the Conference on Disarmament in March 1990, and to the Fourth NPT Review Conference. 31/

G. Confidence-building measures

502. The general goal of these measures is to reduce and possibly eliminate causes for mistrust, misunderstanding and fear, all of which contribute to instability and insecurity. There is need for confidence-building in many fields - political, military, economic and social, among others. Traditional security concerns, mainly military, have been, however, the main source of confidence-building measures (CBMs). Where confidence already exists, CBMs are a way to reinforce it, but they are no substitute for arms regulation and disarmament measures as such.

503. Regarding CBMs specifically concerned with various aspects of nuclear weapons, wide-ranging efforts have been promoted by nuclear-weapon States, most notably the United States and the Soviet Union, but also France and the United Kingdom. Most of the agreements in this field were concluded in the 1960s and 1970s and were related to the process of the strategic arms limitation talks. 32/

504. Thus, in September 1987, the two sides concluded an Agreement on the Establishment of Nuclear Risk Reduction Centres. 33/ According to the Agreement, each party shall establish in its capital a national nuclear risk reduction centre (NRRC). The parties shall use the centres to transmit the following types of notifications: notifications of ballistic missile launches under article IV of the Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War between the USSR and the United States of 1 September 1971; notifications of ballistic missile launches under paragraph 1 of article VI of the Agreement between the USSR and the United States on the Prevention of Incidents on and over the High Seas of 25 May 1972; other communications that each party may, at its own discretion as a display of good will and with a view to building confidence, transmit to the other party. In May 1988, the Soviet Union and the United States signed an Agreement on Notifications of Launches of ICBMs and SLBMs. According to that Agreement, each party agreed to provide the other party notification, through the nuclear risk reduction centres, no less than 24 hours in advance, of the planned date, launch area and area of impact for any launch of an ICBM or SLBM. 34/

505. In June 1989, they signed an Agreement on the Prevention of Dangerous Military Activities, reflecting the desire of the two States to reduce the risk of outbreak of nuclear war, in particular as a result of misinterpretation, miscalculation or accident. 35/ The accord, which took effect on 1 January 1990, covers four areas

of possible conflict: (a) an agreement to refrain from the use of force in the event of a border incursion by the other nation's military forces, aircraft or ships; (b) an agreement not to use laser-range finders or other like devices while the two sides' forces are in close proximity. These devices can temporarily blind soldiers if they are struck directly in the eye; (c) an agreement to set up "special caution zones" in areas such as the Persian Gulf, when both sides' forces come into contact; and (d) an agreement to refrain from electronic jamming of either side's command and communications systems. It is also envisioned that direct communications between the nations' military units in the field will be established to prevent misunderstandings. At the Wyoming ministerial meeting, held in September 1989, both sides signed an agreement on advance notification of major strategic exercises. Under this agreement, each side must provide the other side, on a reciprocal basis, with no less than 14 days' advance notification of the commencement of the one large-scale strategic exercise, with the participation of heavy bombers, which it intends to conduct in the course of each calendar year. At the Washington summit meeting, in May/June 1990, the Soviet Union and the United States agreed to pursue new talks with the objective of reducing further the risk of outbreak of war, particularly nuclear war, and of ensuring strategic stability, transparency and predictability.

H. Nuclear weapons and international law

506. Despite wide-ranging discussions in various forums, no uniform view has emerged as yet on the legal aspects of the possession of nuclear weapons and their use as a means of warfare.

507. The Charter of the United Nations, a document signed just before the world entered the nuclear era, does not refer to the existence of nuclear weapons. The Charter states, in Article 51, that "nothing ... shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations". Under the circumstances, the question of which means are acceptable for exercising the right of self-defence if an attack occurs is left to treaty regulations and to customary law.

508. Some countries, including nuclear-weapon States, consider that nothing in the existing treaty practice of States or in international customary law could be construed to apply to the question of the legality of nuclear weapons either directly or indirectly. Furthermore, they take the position that the use of these weapons is the subject of the decision of the national authorities of the country concerned, which is based on the considerations of its national security requirements and, when applicable, the specific commitments explicitly undertaken in that regard, such as those envisaged in connection with nuclear-weapon-free zones.

509. On the other hand, many countries believe that norms and emerging norms relating to the legality of nuclear weapons and their use derive from a variety of existing sources. In this connection, they point out that the Statute of the International Court of Justice indicates as sources of international law, besides treaties, also "international custom, as evidence of a general practice accepted as

law" and "the general principles of law recognized by civilized nations". It is thus argued that in dealing with the question of the regulation of the possession and the use of nuclear weapons, the guiding principles could be drawn not only from specific treaty provisions, but also from international customary law, general principles of law, judicial decisions and, in some cases, from the resolutions of the Security Council. 36/

510. The proponents of this approach, for instance, point out that customary norms of international humanitarian law applicable in armed conflicts contain some general principles that could be considered to impose certain constraints on the use not only of conventional, but also of nuclear weapons. In their view, the well-established principle in the law of armed conflicts that "the right of the Parties to the conflict to choose methods or means of warfare is not unlimited" 37/ is particularly relevant. They also maintain that there are many other principles of international customary law that have in fact been reflected in modern treaty practice. 38/

511. In this context, they usually refer to the following: (a) a ban on means or methods of warfare that cause unnecessary suffering (in relation to the military objectives that the belligerents hope to attain); (b) the requirement of distinction (between military targets on the one hand and the civilian population and its property on the other); (c) a ban on warfare that leads to indiscriminate effects (weapons or methods of warfare that strike at random against military and civilian values); (d) proportionality (excessive civilian losses when compared with the concrete and direct military advantage to be expected from the attack).

512. Although those principles largely overlap, at the same time, in the opinion of their proponents, their implications are far-reaching. Thus, for instance, the principle of distinction, that both a civilian population and civilian objects as such must not become the target of an armed attack, would imply that "counter-value" strikes would not be allowed. Likewise, the principle of indiscriminate effects means that nuclear attacks that would lead inexorably to massive civilian losses must be avoided. From the principle of proportionality, they infer that nuclear weapons may not as a rule be used in densely populated areas.

513. It is, however, not clear in juridical theory how the existing customary law could be applied with regard to the regulation of the production and possession of such weapons. It is argued in this connection that for a norm to have the status of international customary law, it must reflect a general perception of the norm as legally binding (an opinio juris) and be shown to prevail among the members of the international community. Although there are other views on this question, the fact remains that no consensus (or "near consensus") and thus no general opinio juris has emerged on the question of the production and possession of nuclear weapons.

Notes

1/ For details, see NPT/CONF.III/64/1.

2/ See United Nations Disarmament Yearbook, vol. 10, 1985 (United Nations publication, Sales No. E.86.IX.7), appendix VII.

3/ The positions of the nuclear-weapon States is described in the Memorandum from the Secretariat of the South Pacific Forum on the Subject of the South Pacific Nuclear-Free Zone Treaty Prepared for the Fourth Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT/CONF.IV/16).

4/ See Official Records of the General Assembly, Fifteenth Special Session, Plenary Meetings, A/S-15/PV.4. Foreign Minister Roland Dumas, in his statement at the third special session of the United Nations on disarmament, said:

> "That leads to the question of what we customarily refer to as denuclearized zones. My country has always favoured the establishment of such zones. Naturally, any such undertaking must flow from the unanimous decision of all the States concerned and must be subject to satisfactory control. Moreover, their creation must be military and geographically relevant.
>
> "Clearly, therefore, where nuclear deterrence operates directly, it would be artificial and would add nothing to security to designate regions and declare them denuclearized. It is in the name of these same principles that France has refused to ratify the Protocols of the Rarotonga Treaty instituting a nuclear-free zone in the South Pacific.
>
> "The unanimous consent of States? How could one credit that, when plainly the Treaty in question is aimed at one of the States in the region which conducts its nuclear tests there?
>
> "Geographically relevant? This condition is unfulfilled also, given the ambiguities of the Treaty terms concerning navigation and ports of call. If it jeopardizes freedom of navigation, denuclearization can never be legitimate.
>
> "Militarily relevant? This, too, is dubious, in view of the total absence of any risk of nuclear proliferation in the zone concerned."

5/ United Nations, Treaty Series, vol. 634, No. 9068.

6/ Status of Multilateral Arms Regulation and Disarmament Agreements, 3rd edition, 1987 (United Nations publication, Sales No. E.88.IX.5).

7/ The resolutions were adopted with the following voting results: 40/89 A (148-0-6); 41/55 A (150-0-5); 42/34 A (151-0-4); 43/71 A (151-0-4); and 44/113 A (147-0-4).

8/ Since 1980 all resolutions were adopted without a vote.

Notes (continued)

9/ The resolutions were adopted with the following voting results: 40/83 (104-3-41); 41/49 (107-3-41); 42/29 (114-3-36); 43/66 (116-3-34); 44/109 (116-3-32).

10/ See document SBJ/CONF.III/15, para. 13.

11/ Conference on Disarmament documents CD/570 and CD/571.

12/ "Summary and Text of the INF Treaty and Protocols", in Arms Control Today, vol. 18, No. 1 (January-February 1988), supplement, pp. 1-16. The United Nations Disarmament Yearbook, vol. 12, 1987 (United Nations publication, Sales No. E.88.IX.2), appendix VII.

13/ It covers bases in the following States: Belgium, Czechoslovakia, German Democratic Republic, Germany, Federal Republic of, Italy, Netherlands and United Kingdom.

14/ Arms Control Today, May 1990, p. 27.

15/ United Nations, Treaty Series, vol. 944, No. 13445, p. 3.

16/ The important details of SALT II can be summarized as follows: (a) an equal ceiling of 2,400 on the parties' aggregate of ICBMs, SLBMs and heavy bombers; (b) an equal sub-ceiling of 1,320 on any one of the three categories; (c) an equal sub-ceiling of 1,200 on launchers for MIRVed ICMBs and SLBMs; and (d) an equal sub-ceiling of 820 on MIRVed ICBMs. The different sets of limits are to allow each side to vary its force mixes, which would be legitimate as long as they did not breach any one of the ceilings and sub-ceilings.

17/ Treaty between the USA and the USSR on the Limitation of Strategic Offensive Arms (see CD/53/Appendix III/Vol. I, document CD/28).

18/ United Nations, Treaty Series, vol. 944, No. 13446.

19/ United Nations, Treaty Series, vol. 480, No. 6964, p. 43.

20/ See The United Nations Disarmament Yearbook, vol. 13, 1988 (United Nations publication, Sales No. E.89.IX.5), p. 201.

21/ Official Records of the General Assembly, Forty-fourth Session, Supplement No. 27 (A/44/27), p. 19.

22/ For the text of the Treaty, see Arms Control and Disarmament Agreements, United States Arms Control and Disarmament Agency, Washington, D.C., 1982.

23/ For details, see NPT/CONF.IV/2.

24/ For updated versions of the individual declarations, see NPT/CONF.IV/11.

Notes (continued)

25/ Official Records of the General Assembly, Tenth Special Session, Plenary Meetings, A/S-10/PV.14.

26/ The resolutions were adopted with the following voting results: 37/78 I (130-0-17); 38/183 G (128-0-20); 39/148 P (128-6-12); 40/152 Q (136-3-14); 41/86 G (134-3-14); 42/42 D (140-3-14); and 43/78 F (136-3-14).

27/ The resolutions were adopted with the following voting results: 37/78 J (112-19-15); 38/183 B (110-19-15); 39/148 D (101-19-17); 40/152 A (123-19-7); 41/86 B (118-17-10); 42/42 A (125-17-12); 43/78 B (127-17-6); and 44/119 B (129-17-7).

28/ The resolutions were adopted with the following voting results: 37/100 C (117-17-8); 38/73 G (126-17-6); 39/63 H (126-17-5); 40/151 F (126-17-6); 41/60 F (132-17-4); 42/39 C (135-17-4); 43/76 E (133-17-4); and 44/117 C (134-17-4).

29/ The United Nations Disarmament Yearbook, vol. 14, 1989, (United Nations publication, Sales No. E.90.IX.4), chap. VIII, annex.

30/ For details, see Official Records of the General Assembly, Forty-fourth Session, Supplement No. 27 (A/44/27).

31/ NPT/CONF.IV/17.

32/ Memorandum of Understanding Regarding the Establishment of a Direct Communications Link (1963); Agreement on Measures to Improve the United States-USSR Direct Communications Link (1971); Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War (1971); Agreement on the Prevention of Nuclear War (1973); and Agreement on the Prevention of Incidents on and over the High Seas (1972). The Soviet Union concluded almost identical agreements on the prevention of high-sea incidents with the United Kingdom in 1986, the Federal Republic of Germany in 1988, and with Canada, France, Italy and Norway in 1989.

33/ CD/814 and CD/815.

34/ CD/845 and CD/847.

35/ CD/943.

36/ Burns H. Weston, "Nuclear Weapons Versus International Law: 'Contextual Reassessment'", McGill Law Journal, vol. 28, No. 3, July 1983, p. 541.

37/ Quotation from art. 35 (1), Protocol I, of the 1977 Additional Protocols to the Geneva Conventions of 1949.

38/ Ibid., art. 35 (2). Additional Protocol I at present has 92 parties. Among the nuclear-weapon States, China and the Soviet Union have ratified the Protocol and the United Kingdom is expected to do so.

CHAPTER IX

CONCLUSIONS

514. Nuclear weapons represent a historically new form of weaponry with unparalleled destructive potential. A single large nuclear weapon could release explosive power comparable to all the energy released from the conventional weapons used in all past wars.

515. Only two nuclear weapons have ever been used in a war. Today, there are about 50,000 nuclear warheads in the possession of the nuclear-weapon States. The quantitative growth of the nuclear-weapon arsenals has, however, been stopped. The number of nuclear warheads is now declining.

516. In recent years, there has been a marked improvement in the overall international political climate and in relations between a number of States in various regions of the world. The most far-reaching changes have taken place in Europe, a continent where the two major nuclear Powers and their military alliances have confronted each other for decades. New political patterns are emerging there, whereby long-standing differences are being resolved and the cold war is ending. Although tensions remain in some other regions, several fierce armed conflicts have been brought to an end and the process of peacefully resolving some other conflicts has been initiated. The United Nations has played an important role in the process of conflict-resolution and peace-keeping and thereby made a tangible contribution to the maintenance of international peace and security, one of its main objectives.

517. These positive developments in the world, in particular the rapprochement between East and West, have given strong impetus to arms limitation and disarmament efforts, especially in Europe.

518. The most tangible results thus far have been achieved in the bilateral negotiations between the United States and the Soviet Union. In December 1987, the Soviet Union and the United States concluded the first agreement in history - the INF Treaty - which provides for the destruction of a whole category of nuclear missiles, and as such represents a major breakthrough in the disarmament process. In terms of quantitative reductions of strategic nuclear weapons, significant progress has been made in bilateral START negotiations between the United States and the Soviet Union. The framework of an agreement signed at Washington in June 1990 at the summit meeting between President Bush and President Gorbachev provides for a drastic cut in various categories of their strategic offensive arms. Their agreement to continue negotiations on further cuts and effective limitations on qualitative improvements in both strategic and tactical nuclear weapons is most important.

519. The United States and the Soviet Union have stated that reducing the risk of outbreak of nuclear war is the responsibility not only of the United States and the Soviet Union, but that other States should also make their contribution toward the attainment of this objective.

520. East and West are expected to reach an agreement on significant reductions of conventional forces in Europe that would facilitate additional cuts of other nuclear weapons stationed in Europe. In addition, several countries in both East and West - including the Soviet Union and the United States - are now unilaterally taking steps to reduce and to restructure their military forces.

521. Notwithstanding the bilateral agreements between the United States and the Soviet Union concerning nuclear weapons, their nuclear stockpiles will continue to be far in excess of those of the other nuclear-weapon States for the foreseeable future.

522. Qualitative improvements of nuclear weapons have continued. Nuclear tests are still carried out, though at a reduced rate. The production of fissionable material for weapons purposes has been reduced.

523. Most countries in the world consider that an early end to nuclear testing by all States in all environments would be an essential step towards preventing the qualitative improvement and the development of new nuclear weapons and would also contribute to the goal of non-proliferation. Most nuclear-weapon States consider that their reliance on nuclear weapons for their security requires their continued testing and do not agree that a comprehensive test ban is an urgent necessity.

524. The United States and the Soviet Union have agreed to continue to co-operate in the field of monitoring nuclear-weapon tests. Multilateral and bilateral efforts to perfect verification methods for a comprehensive nuclear-test ban are important for achieving the ultimate complete cessation of such tests.

525. In the 1980s, the deployment of nuclear weapons at sea also became the subject of growing attention of many States. About 30 per cent of nuclear weapons are earmarked for maritime deployment. Sea-borne strategic nuclear weapons are subject to bilateral negotiations between the United States and the Soviet Union. This is not yet the case with regard to non-strategic sea-based nuclear weapons intended for targets at sea and on land.

526. Another feature of the 1980s has been the preoccupation of many non-nuclear-weapon States with the question of legal restraints on nuclear weapons, particularly as regards their non-use. Considering that, since 1945, no single nuclear weapon has actually been used, they believe that the de facto non-use of nuclear weapons might eventually serve as the basis for establishing a customary norm on the non-use of nuclear weapons. They believe that the different approaches to international customary and treaty law that relate to this matter deserve further consideration. Some nuclear-weapon States do not agree with this assessment.

527. There is a manifest conviction of the entire international community that a major nuclear war would have catastrophic consequences for the whole world. During the last decade, the nuclear Powers have clearly stated their determination to avoid any nuclear conflict. This was most convincingly expressed both in the 1985 solemn declaration by former President Reagan and President Gorbachev that "a nuclear war cannot be won and must never be fought" and in the statement by President Mitterrand that "nuclear weapons are weapons of non-use".

528. The Heads of State and Government of the North Atlantic Alliance confirmed on 6 July 1990 that they would "never in any circumstance be the first to use force", and announced that in a transformed Europe the Allies concerned would be able to adopt a new strategy making nuclear forces truly weapons of last resort.

529. In the last decade, the findings of several scientific studies about the possible effects of nuclear war, including the climatic effects subsumed in the concept of "nuclear winter", have added a new dimension to the discussion of the global consequences of nuclear war. These studies, inter alia, suggested that a nuclear war might cause more casualties than previously thought in countries other than those immediately involved.

530. The Chernobyl reactor accident in 1986, though not comparable to a nuclear detonation because it was only the source of radioactive debris and did not have the other effects peculiar to a nuclear explosion, provided a concrete demonstration of the magnitude of the consequences of even a relatively limited release of radioactive matter.

531. During the 1980s, the question of the contamination of the environment in connection with military and civilian nuclear activities, and the effects of such contamination, received increased public attention. In this regard, the work being done by the relevant national and international organizations is valuable in helping to understand the impact of these activities on health and the environment.

532. The momentous changes in the world, particularly in the East-West relationship, have diminished the threat of nuclear confrontation and made it possible to start a real process of reduction of nuclear weapons. The United States and the Soviet Union are engaged in far-reaching bilateral negotiations, which they have agreed should ultimately lead to the complete elimination of nuclear arms everywhere. Other nuclear-weapon Powers have stated that they would be willing to take part in the process of nuclear disarmament at an appropriate stage. Moreover, as recently reiterated by the Disarmament Commission, all States have the right and the duty to be concerned with and to contribute to efforts in the field of disarmament.

533. However, differences remain between States concerning mainly the timing and procedures for nuclear disarmament measures, on the one hand, and the existence and scope of international norms regarding nuclear weapons, on the other.

534. The nuclear non-proliferation régime is as important as ever. Its strict observance is of continued fundamental importance. Concern about nuclear proliferation remains acute, particularly in the light of technological developments that could make the acquisition of nuclear weapons by additional States easier, and in the light of the uncertainties surrounding the policies of some States, including some involved in regional rivalries and tensions.

535. Further efforts are necessary to prevent the acquisition or manufacture of nuclear weapons by additional States, to strengthen the international non-proliferation régime and to achieve wider participation in it. The régime would also be strengthened if NPT parties that have not already done so concluded the requisite safeguard agreements with IAEA.

536. The right of States to develop nuclear technology for economic benefit must be reconciled with the need to ensure against the further spread of nuclear weapons. Prior to any transfer of fissionable materials, nuclear equipment or know-how, acceptance of appropriate IAEA safeguards is an especially important part of the agreement between supplier and recipient.

537. To achieve the objectives of non-proliferation of nuclear weapons, global and regional efforts are needed, including those aimed at further strengthening the non-proliferation régime in all its aspects.

538. International security is now being perceived on the basis that reliance on military strength for national security will be increasingly supplemented by policies of confidence-building and wide co-operation in various fields, and negotiation and dialogue with the view to strengthening the security of all.

APPENDIX I

Official doctrinal positions of the nuclear-weapon States

CHINA

[Original: Chinese]

Basic positions of the Government of China on nuclear weapons and nuclear disarmament

1. China has consistently opposed the arms race and is dedicated to the cause of maintaining world peace and security. China always stands for disarmament and complete prohibition and thorough destruction of nuclear weapons.

2. China declared on the very first day when it came into possession of nuclear weapons that at no time and under no circumstances would it be the first to use nuclear weapons. China respects the status of the existing nuclear-weapon-free zones and will not use, or threaten to use, nuclear weapons against non-nuclear-weapon States or nuclear-weapon-free zones.

3. With respect to nuclear disarmament, China is of the view that:

(a) The ultimate goal of nuclear disarmament should be the complete prohibition and thorough destruction of nuclear weapons. All measures aimed at nuclear disarmament should serve the realization of this goal;

(b) The United States of America and the Union of Soviet Socialist Republics possess the world's largest and most sophisticated nuclear arsenals and are still improving and upgrading their nuclear weapons. They bear a special responsibility for halting the nuclear arms race and reducing nuclear weapons. They should take the lead in halting the testing, production and deployment of all types of nuclear weapons, reducing and destroying drastically all types of nuclear weapons that they have deployed anywhere inside or outside their countries. After this is done, a broadly representative international conference on nuclear disarmament may be convened with the participation of all nuclear-weapon States to discuss further steps and measures for thorough destruction of nuclear weapons. This would be a truly effective way to achieve nuclear disarmament;

(c) As an effective measure to prevent nuclear war, all nuclear-weapon States should undertake not to be the first to use nuclear weapons at any time and under any circumstances, and not to use or threaten to use nuclear weapons against non-nuclear-weapon States and nuclear-weapon-free zones. On this basis, an international convention banning the use of nuclear weapons should be concluded with the participation of all the nuclear-weapon States.

FRANCE

[Original: French]

Defence doctrine of France

1. France's defence doctrine rests on nuclear deterrence. As the President of the Republic said in his speech to the Institute of Advanced National Defence Studies on 11 October 1988:

> "Deterrence means preventing any possible aggressor from meddling with our vital interests because of the risks he would run. Deterrence does not exist to win war but to prevent, to forestall it."

2. The point is that the weak can deter the strong by means of a range of resources capable of persuading the opponent that the nuclear risk he runs on his own territory would outweigh any benefit he might think to gain by attacking France.

3. A nuclear weapon is thus a political weapon, a diplomatic weapon for keeping balance and countering blackmail from any source. It renders the very enterprise of war pointless, since war becomes impossible to win.

4. This is why France's deterrent force does not seek to match the opponent's nuclear capacity but is based on the idea of sufficiency, made possible by the equalizing power of the atom.

5. This is also why it must be maintained above the credibility threshold by means of continuous, technologically wholly independent modernization.

6. Given the seriousness of the stakes, France considers that only a threat to its vital interests - that is, the very existence of the nation - could justify the use of its force de frappe (strike force). For that very reason, the decision to use force rests with the Head of State alone, whose autonomy must be absolute: he is the one who has to define where France's vital interests begin.

7. French deterrence has another component, the final warning, which is an integral part of it. The final warning, delivered against a military target - by pre-strategic weapons in the first instance, even if the final warning is not solely a matter for short-range weapons - is to indicate to the aggressor that the vital interests of France are at stake and that continued aggression will result in strategic weapons being used.

8. By offering a chance of last-minute negotiations, the final warning theory enhances overall deterrence.

9. France's autonomy of decision allows the criteria for and timing of the use of nuclear force in the event of aggression to remain uncertain, thus increasing the deterrence effect.

10. While nuclear weapons, on which deterrence rests, have been chiefly responsible for keeping the peace for more than 40 years, and while France believes that the human mind cannot come up with any credible alternative to nuclear weaponry for exercising deterrence, this of course does not make France any less well-disposed towards efforts to reduce nuclear over-armament. It thus attaches the highest priority to Soviet-American strategic talks and devoutly hopes for an agreement resulting in a substantial reduction in the arsenals concerned. It hopes that those efforts will continue.

11. The French President, speaking on 28 September 1983 at the United Nations, clearly stated the three prior conditions France has set before it will take part in any negotiations:

> "The first of these conditions is the correction of the fundamental difference, in terms of type and quantity, between the armaments of the two major Powers and those of the others ...
>
> "The second condition flows from the wide gap between conventional forces, particularly in Europe, a gap which has become even wider ... because of the existence of chemical and biological weapons, the manufacture and stockpiling of which must be prohibited by a convention.
>
> "The third condition is the cessation of the escalation in anti-missile, anti-submarine and anti-satellite weapons."

12. France devoutly hopes that these conditions will be fulfilled and will spare no effort to attain this end.

UNION OF SOVIET SOCIALIST REPUBLICS

[Original: Russian]

Military doctrine of the USSR

1. Soviet military doctrine is profoundly defensive, aimed at guaranteeing the security of the USSR and its allies. Its goal is not to prepare for, but to prevent, nuclear war.

2. That goal was reflected, in particular, in the Soviet Union's pledge never in any circumstances to be the first to use nuclear weapons. That most important political act reflects the determination of the Soviet Union to work for the gradual reduction and, ultimately, complete elimination of the risk of a nuclear war. The Soviet Union believes that a nuclear war must never be fought and cannot be won.

3. The Soviet Union is a staunch opponent of war in all its aspects. It considers that a nuclear war, once begun, would assume global proportions and would have disastrous consequences not only for the belligerents but for all mankind; the assumption that such a war can be restricted to one region or theatre of operations is untenable.

4. Historically, the Soviet Union was compelled to develop nuclear weapons and subsequently assemble nuclear forces as a countermeasure.

5. However, the USSR considers that state of affairs to be an intermediate stage in the radical reduction of nuclear weapons - which has already begun - since the current balance of the nuclear potentials of the opposing sides is disproportionately high and, for the time being, only guarantees equal peril for both sides. The continuation of the nuclear-arms race will inevitably increase that equal peril and may lead to a situation in which even parity will cease to be a factor in military and political restraint.

6. Hence, the Soviet Union is in favour of guaranteeing strategic stability at the lowest possible level of nuclear balance and, in the long run, eliminating nuclear weapons completely. This goal, of course, cannot be achieved immediately. It has to be approached through a process of step-by-step reductions by all nuclear-weapon States, with guarantees, at every stage, of international security and strategic stability.

7. The Soviet Union has put forward a balanced programme for the elimination of nuclear weapons by the year 2000, which was presented in the statement by the General Secretary of the Central Committee of the Communist Party of the Soviet Union, Mr. M. S. Gorbachev, on 15 January 1986.

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

[Original: English]

United Kingdom nuclear doctrine: Deterrence after the INF Treaty

1. The central aim of the NATO Alliance's defence effort is clear and simple: to remove the option of war permanently from the East/West scene. Nuclear weapons have made this aim wholly compelling and for that very reason wholly attainable. Their virtually infinite destructive power has made nonsense of the idea of war as a contest of strength. That result is irreversible, since it rests on scientific knowledge that cannot be forgotten. The right course is not to attempt vainly to dissolve it, but to build around it a war-prevention system that, without surrendering the great stability we have now, will become progressively less costly and less abrasive.

2. The goal must be a system giving each side thorough assurance - grounded, amid the strains of a changing world, not on beliefs about attitude or motive but on objective military fact - that the other neither has nor seeks options for resolving differences by force. If the East shares that goal, it can increasingly be attained through open and well-understood policies cancelling war not through the brandishing of armaments but through their quiet maintenance at the lowest level needed to ensure that the utter irrationality of aggression remains a plain certainty.

3. Much that President Gorbachev has said encourages us to hope that he may see the central security need increasingly as we do. There seems ground for optimism that, both in the extensive arms control agenda and elsewhere, he will be ready to work with us towards a less tense and costly security system. The Soviet Union still has much larger forces in most categories, and its strategic situation is not the same as the West's; its priorities therefore are different. But with agreement on the central goal, patient and clear-sighted work can bring both parties steadily closer to it in safety.

4. The 1987 INF Treaty, achieved as growing Soviet realism converged with NATO steadfastness, was a major advance in easing tension and building confidence. Its content was specific and exact: the strictly verified abolition of a defined class of missiles. Nothing in it implies an agreement to abandon operational roles or strategies, or leave a hole in the middle of NATO's ability to respond flexibly.

5. Flexible response is the only strategic concept that makes sense for a defensive alliance in the nuclear age. Military victory in the classical sense is not feasible; the use of force at any level, but especially the nuclear level, can have no other aim than to deny an aggressor swift success and to show him that he has underrated the defender's resolve and must, for his own survival, back off. The circumstances in which this task would arise could vary greatly; the defence must therefore have a wide range of options, enabling it to react to any military situation promptly and with the least force needed for the basic political aim of ending the war. Nothing in the INF Treaty makes this strategy less apt than before, or reduces the need to ensure, through the manifest ability to implement it in credible ways, that aggression can never be attractive.

6. For flexible response NATO has to maintain an effective nuclear armoury at several levels. Strategic weapons alone, for all their awesome power, could not be morally tolerable, practically feasible or politically credible for every scenario. Our needs at non-strategic levels will continue to evolve in line with our arms-control commitments, with new technology and with deeper understanding on both sides of the minimum imperatives of mutually assured security. NATO has made major cuts in its non-strategic armoury; the number of warheads in Europe is now 35 per cent less than in 1979, and will fall further by mid-1991. The INF Treaty's abolition of intermediate-range missiles follows past NATO decisions to abandon successively nuclear infantry weapons, nuclear anti-aircraft missiles and nuclear land-mines.

7. Cuts in the armoury can go further yet, and the alliance is working on the possibilities. But the aim for which the armoury as a whole exists, of surely preventing war, cannot be served if we attempt to follow simultaneously both the path of cuts and the path of obsolescence. Nuclear weapons are not mere symbols; like other weapons, they can deter only by evident capability for effective use. Modern technology offers major improvements in range, accuracy and target-acquisition, and these can enable us to cut weapon numbers. But there is no prudent basis for making the cuts without the improvements.

8. NATO is studying how to keep up-to-date its armoury of warheads supported by the provision of delivery systems and basing arrangements in which European nations rightly share the burden. NATO's military authorities have reported on this to the Nuclear Planning Group. Ministers will consider the steps that need to be taken, for example, replacing the Lance missile, to keep the armoury as a whole at the standard of effectiveness and versatility, and no larger than the minimum size, needed to sustain its purpose.

9. The United Kingdom will continue to play a full part in this effort, and also to maintain the independent non-strategic contribution without which the value of our strategic force, which provides a separate second centre of nuclear decision-making in support of Alliance strategy, would be seriously incomplete. Our non-strategic contribution has since the 1960s rested on WE177 free-fall weapons, usable from various aircraft and in various roles. For technical and operational reasons, these cannot all be relied upon beyond the 1990s. As with the rest of the Western armoury, numbers and types may not have to be kept at present levels; that needs further study. But, under the strategy of flexible response, the basic need for some non-strategic weapons will remain, and procurement lead-times means that initial decisions on modernization - particularly on the choice of an air-launched missile to which warhead work at Aldermaston will be geared - must be taken before long.

10. Work like this has its full counterpart on the Soviet side. Nothing that President Gorbachev has said or done is ground for imagining that he will run military risks with his country's security on suppositions about Western goodwill. We must be similarly objective, recognizing that if there is indeed a Soviet reassessment enabling us all to work together more constructively, it would be folly to dismantle, or let decay, the very structures that have helped to induce it. Cool and steady realism of this kind is not an obstacle but the best guide to strengthening the security system we seek - one in which the total neutralization of war, by agreed non-confrontational means, becomes so sure, accepted and permanent that, even when interests may differ widely, nations of East and West can conduct their business together by means in which the thought of armed conflict simply plays no part.

UNITED STATES OF AMERICA

[Original: English]

United States deterrence policy

1. Deterrence works by making clear that the costs of aggression will exceed any possible gain. This is the basis of United States military strategy against both conventional and nuclear aggression; because conflict carries the risk of escalation, the United States goal is to dissuade aggression of any kind and to prevent coercion of the United States, its allies and friends.

2. To ensure deterrence, the United States must make clear that it has both the capability and the will to respond effectively to coercion or aggression. While

emphasizing its resolve to respond, the United States must avoid specifying just what form the response will take. This is the essence of "flexible response," which has been United States policy since 1961 and a key element of NATO strategy since 1967. A potential aggressor faces three types of possible response by the United States:

(a) Direct defence: to pose the possibility that aggression will be stopped without actions that escalate the conflict. This is sometimes referred to as "deterrence through denial". Defending against conventional attack with conventional forces is an example of direct defence;

(b) Threat of escalation: to warn that aggression could start hostilities that might not be confined to conventional response only, and that escalation could lead to costs that far outweigh any possible gain and that are greater than an aggressor anticipates or could bear. In this regard, NATO's deterrence of aggression is enhanced by NATO resolve to use nuclear weapons, if necessary, to halt that aggression;

(c) Threat of retaliation: to raise the prospect that an attack will trigger a retaliatory attack on the aggressor's homeland, causing him losses that far outweigh any possible gain.

3. While deterrence requires capabilities across the entire spectrum of nuclear conflict, its essential foundation is provided by United States strategic nuclear forces and the doctrine that supports them. The United States must ensure that the effectiveness of these forces and the will to use them, if necessary, are never in doubt.

4. The United States maintains diversified strategic retaliatory forces to prevent a disarming first strike. It maintains a variety of basing modes, launch platforms and attack vehicles, with a triad of submarine-launched ballistic missiles, ground-based intercontinental ballistic missiles and strategic bombers. Adequate and survivable command, control and communications are also essential to United States force structure and to the credibility of the deterrent.

5. United States forces and targeting policy must be perceived as making nuclear warfare unacceptable. The United States does not target populations as an objective in itself and seeks to minimize collateral damage through more accurate, lower-yield weapons.

6. Holding at risk the full range of a potential aggressor's assets is necessary for deterrence, but is not sufficient. United States options in response to aggression cannot be limited to capitulation or mutual destruction. The United States must have the capability and the resolve to employ a broad range of military options.

7. Finally, the United States requires residual capability, as leverage for early war termination and to avoid post-conflict coercion. For this reason, a nuclear reserve force is an integral part of United States strategic forces. In addition, the United States maintains continuity of Government programmes to ensure its

capability to retaliate in case of an attack aimed at incapacitating its political and military leadership.

8. These capabilities do not imply that the United States seeks the ability to fight a nuclear war. The United States has repeatedly emphasized that nuclear war cannot be won and must never be fought. But any adversaries must understand that they cannot gain their objectives through nuclear warfare or nuclear coercion under any circumstances.

9. Continuing modernization of United States forces is essential. While the United States is committed to arms reductions as one component of policy for enhancing United States and allied security, this does not remove the need for modern nuclear forces for deterrence. Neglecting modernization in expectation of arms reduction agreements would decrease the likelihood of such agreements by reducing incentives to negotiate.

APPENDIX II

Land- and sea-based nuclear weapons

Weapon type	Number in service	Range (km)	Warhead load and yield	Warhead type	Number in the stockpile
1. UNITED STATES a/					
ICBMs					
Minuteman II	450	11 300	1x1.2 Mt	W56	450
Minuteman III	200	13 000	3x170 kt	W62	600
Minuteman III (MK12A)	300	13 000	3x335 kt	W78	900
MX	50	11 000	10x300 kt	W87	500
	1 000				2 450
SLBMs					
Poseidon	224	4 600	10x40 kt	W68	2 240
Trident I	384	7 400	8x100 kt	W76	3 072
	608				5 312
Bombers					
B-1B	97	9 800	22 total either ALCM (200 kt each, 2,500 km) or bombs (B28, 61, 83) or SRAM		1 614
FB-111A	59	4 700	6 SRAM (170 kt, 200 km) or 6 bombs (B43, 61, 83)		2 484
B-52G/H	193	16 000	B-52G/H 20 SRAM or B-52G 12 ALCMs and 6 bombs; B-52H 12 ALCM externally mounted and 8 internally mounted		1 140
	349				5 238

B-1Bs and B-52s can carry a mix of 8 weapons mounted externally and 24 weapons in internal bomb racks. The FB-111A can carry 6 weapons, excluding ALCMs, B53 and B28. Individual bombs in the United States inventory can vary greatly in yield. The B28 has 5 yields, 4 of which are known: 70 kt, 350 kt, 1.1 Mt and 1.45 Mt. The B43 has a 1 Mt yield. The B53 has a 9 Mt yield. The B57 has a sub 20 kt yield. The B61-0, -1, -7 have 4 yield options in the 100-500 kt range.

Weapon type	Number in service	Range (km)	Warhead load and yield	Warhead type	Number in the stockpile
The B83 is said to have a yield of 1,000+ kt. The W69 Short-Range Attack Missile (SRAM) has a yield in the 170-200 kt range, and the W80-1 Air-Launched Cruise Missile (ALCM) has a 200-250 kt yield. b/					
Land-based aircraft c/					
	2 250	1 060-2 400			1 800
F-4 C/D/E			2,170 lbs. max. 3xbombs (B28RE, B43, B57, B61, B83 Genie)		
F-15 A/C			5 pylons 16,000 lbs. max. (W25, 833 lbs. each or Genie 1.5 kt)		
F-16 A/B/C/D			possibly 5 nuclear weapons (B43, B57)		
F-111 A/D/E/F			3 bombs (B43, B57, B61, B83)		
Missiles					
Pershing II	111	1 790	1x.3-80 kt	W85	125
GLCM	250	2 500	1x.2-150 kt	W84	325
Pershing IA	72	740	1x60-400 kt	W50	100
Lance	100	125	1x1-100 kt	W70	1 282
Nike Hercules	27	160	1x1-20 kt	W31	75
					1 897
Artillery					
155 mm and 203 mm	3 850	30	1x.1-12 kt		1 540
Atomic Demolition Munition (ADM)	150	..	1x.01-1 kt	W54	150
Naval systems					
Carrier aircraft	1 100 d/				
1450					
A-6E			3x B28 or B43 or B57 or B61, also Harpoon		
A-7E			4x (B28, B43, 57, 61)		
F/A-18A/B			2x (B61)		

/...

Weapon type	Number in service	Range (km)	Warhead load and yield	Warhead type	Number in the stockpile
Marine Corps					
A-4M			1x (B28, 43, 57, 61)		
AV-6B			1x B61		
ASW systems					
ASROC	?	1-10	1x5-10 kt	W44	574
SUBROC	?	60	1x5-10 kt	W55	285
ASW aircraft	710	1 160-3 800	1x < 20 kt	B57	897
Aircraft include P-3A/B/C, S-3A/B, SH-3D/H. Some of the B57 nuclear depth bombs are allocated to British Nimrods, Italian Atlantics and Dutch P-3s.					
Missiles					
Tomahawk (land attack)	200	2 500	1x5-150 kt	W80-0	200
Naval SAMs					
Terrier	?	35	1x1 kt	W45	290 e/
2. SOVIET UNION					
ICBMs					
SS-11 Mod 2		13 000	1x.950-1.1 Mt		160
Mod 3	380	10 600	3x100-350 kt (MRV)		630
SS-13 Mod 2	60	9 400	1x600-750 kt		60
SS-17 Mod 2	110	10 000	4x750 kt (MIRV)		480
SS-18 Mod 4	308	11 000	10x550 kt (MIRV)		3 080
SS-19 Mod 3	320	10 000	6x500 kt (MIRV)		2 100
SS-24	58	10 000	10x100 kt (MIRV)		200
SS-25	162	10 500	1x550 kt		150
	1 398				6 860
SLBMs					
SS-N-6 Mod 3	240	3 000	2x.375-1 Mt (MRV)		480
SS-N-8 Mod 1/2	286	7 800	1x1-1.5 Mt		286
SS-N-17	12	3 900	1x.5-1 Mt		12
SS-N-18 Mod 1/3	6 500	6 500	7x200-500 kt		
Mod 2	224	8 000	1x.45-1 Mt		1 568
SS-N-20	100	8 300	10x100 kt		1 000
SS-N-23	80	7 240	4x100 kt		256
	942				3 602
Bombers					
Tu-95 A		8 300	4 bombs		30
Tu-95 B/C		8 300	5 bombs or AS-3		100
Tu-95 G		8 300	4 bombs and 2 AS-4		270
Tu-95 H	153	8 300	8 AS-15 and 4 bombs		600
Tu-160 Blackjack	9	?	AS-15 and 4 bombs		100
	162 f/				1 100

/...

Weapon type	Number in service	Range (km)	Warhead load and yield	Warhead type	Number in the stockpile
Anti-ballistic missiles					
ABM-1B (Galosh)	32	320	1x unknown		32
ABM-3	68	70	1xlow yield		68
	100				100 g/
Land-based systems					
Aircraft					
Tu-26	180	4 000	1-3xbombs or ASM		360
Tu-16	210	3 100	1-2xbombs or ASM		250
Tu-22	330	2 900-3 300	1-2xbombs or 1 ASM		120
Tactical aircraft	4 050	700-1 300	1-2xbombs		3 230
Missiles					
SS-20	318	5 000	3x250 kt		1 215
SS-4	18	2 000	1x1 Mt		65
SS-12	135	900	1x500 kt		405
SS-1c	620	280	1x1-10 kt		1 370
SS-23	239	500	1x100 kt		239
FROG7	658	70	1x1-25 kt		200
SS-21	289	120	1x10-100 kt		1 100
SS-SHCH Scud b	601	?	?		?
SS-C-1b	100	450	1x50-200 kt		100
SAMs	7 000	40-300	1xlow yield		4 000
Artillery	6 760	10-30	1xlow yield		2 000
ADMs	?	?	?		?
Naval systems					
SS-N-5	36	1 400	1x1 Mt		36
Aircraft					
Tu-26	140	4 000	1-3xbombs or ASM		280
Tu-16	170	3 100	1-2xbombs or ASM		170
Tu-22	30	2 900-3 300	1xbombs		30
ASW aircraft	375	...	1x depth bombs		400

Nuclear-capable tactical aircraft include MiG-21 Fishbed L, MiG-23 Flogger B/G, MiG-27 Flogger D/J, Su-7B Fitter A, Su-17 Fitter C/D/H and Su-24 A/B/C/D/E.

ASW aircraft include Be-12 Mail, Il-38 May, Tu-142 Bear F, Ka-25 Hormone and KA-27 Helix helicopters.

Anti-shipping missiles					
SS-N-3	228	450	1x350 kt		120
SS-N-7	90	65	1x200 kt		44
SS-N-9	208	280	1x200 kt		78
SS-N-12	200	550	1x350 kt		76
SS-N-19	136	550	1x500 kt		56
SS-N-22	80	100	1x200 kt		24

Weapon type	Number in service	Range (km)	Warhead load and yield	Warhead type	Number in the stockpile
Land attack					
SS-N-21	4	3 000	1x200 kt		16
SS-NX-24	0	<3 000	1x?		0
ASW missiles/torpedoes					
SS-N-15		37	1x10 kt		?
SS-N-16	400	120	1x10 kt		400
Fras-1	25	30	1x5 kt		25
Torpedoes type	65	16	1x low kt		
ET-80	575	>16	1x low kt		575
Naval SAMs					
SA-N-1	65	22	1x10 kt		
SA-N-3	43	37	1x10 kt		
SA-N-6	33	65	1x kt		260 h/
3. UNITED KINGDOM					
Aircraft					
Buccaneer S2B	25	1 700	1x5-400/200 bomb	WE177	
Tornado GR-1	220	1 300	1-2x400/200 kt	WE177	155-175
SLBMs					
Polaris A3-TK (Chevaline)	64	4 700	2x40 kt	MRV	128
Carrier aircraft					
Sea Harrier					
FRS 1	42	450	1x10 kt	WE177	42
ASW helicopters					
Sea King HAS 5	56	...	1x10 kt		
Lynx HAS 2/3	78	...	1x10 kt		25 i/
4. FRANCE					
Aircraft					
Mirage 2000N/ASMP	15	1 570	1x300 kt	TN81	15
Mirage IVp/ASMP	18	1 500 (plus ASMP range of 80-250 km)	1x300 kt	TN80	20
Jaguar A	45	750	1x6-8/30 kt bomb	ant-52	50
Mirage IIIE	15	600	1x6-8/30 kt bomb	ant-52	35
Land missiles					
S3D	18	3 500	1x1 Mt	tn-61	18
Pluton	44	120	1x10/25 kt	ant-51	70

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Weapon type	Number in service	Range (km)	Warhead load and yield	Warhead type	Number in the stockpile
SLBMs					
M-20	64	3 000	1x1 Mt	tn-61	64
M-4A	16	4 000-5 000	6x150 kt (MIRV)	tn-70	96
M-4B	16	6 000	6x150 kt (MIRV)	tn-71	96
Carrier aircraft					
Super Etendard	36	650	1x6-8/30 kt bomb	ant-52	40 j/
5. CHINA					
Aircraft					
B-5 (IL28)	15-30	1 850	1xbomb (20 kt-3 Mt)		15-30
B-6 (Tu-16)	100	5 900	1-3xbomb (20 kt-3 Mt)		100-130
Land missiles					
DF-2 (CSS-1)	30-50	1 450	1x20 kt		30-50
DF-3 (CSS-2)	75-100	2 600	1x1-3 Mt		75-100
DF-4 (CSS-3)	~10	4 800-7 000	1x1-3 Mt		~10
DF-5 (CSS-4)	~10	13 000	1x4-5 Mt		~10
SLBMs					
CSS-N-3 (JL-1)	24	3 300	1x200 kt-1 Mt		26-38 k/

a/ All data on United States strategic forces from SIPRI Yearbook 1989, p. 12.

b/ Thomas B. Cochran et al., eds., Nuclear Weapons Databook Vol. I: United States Nuclear Forces and Capabilities, Cambridge, Ballinger, 1984, pp. 41-79. The variants also differ in the types of PALs.

c/ The "numbers in service" refers to the total number of aircraft with nuclear capability in the United States arsenal. The range refers to the minimum and maximum range for this group of aircraft.

d/ This number is the total number of nuclear-capable carrier aircraft in the United States Navy.

e/ SIPRI Yearbook 1989, p. 13. Cochran op. cit., United States Nuclear Forces, pp. 205-210, 213-223 and 232.

f/ Data from Soviet official submission to the study and SIPRI Yearbook 1989, p. 14.

g/ Data on Blackjack from Institute for Defense and Disarmament Studies (IDDS), Arms Control Reporter 1989, Brookline, IDDS, 1989, p. 611.E.1. Other data from SIPRI Yearbook 1989, p. 15.

h/ Data on theatre forces from SIPRI Yearbook 1989, pp. 16 and 17.

i/ British data from SIPRI Yearbook 1989, p. 18.

j/ SIPRI Yearbook 1989, p. 19.

k/ Ibid., p. 20.